

Richardson Flat Park City, Utah

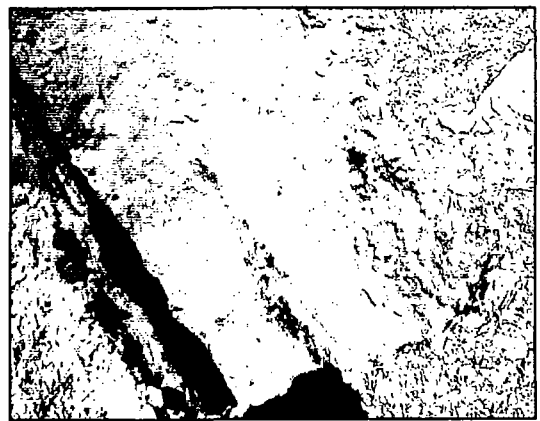
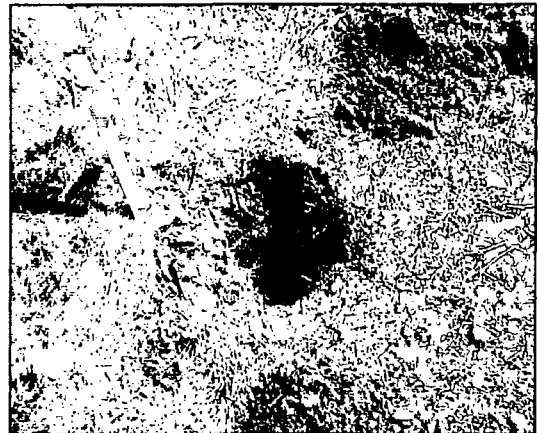
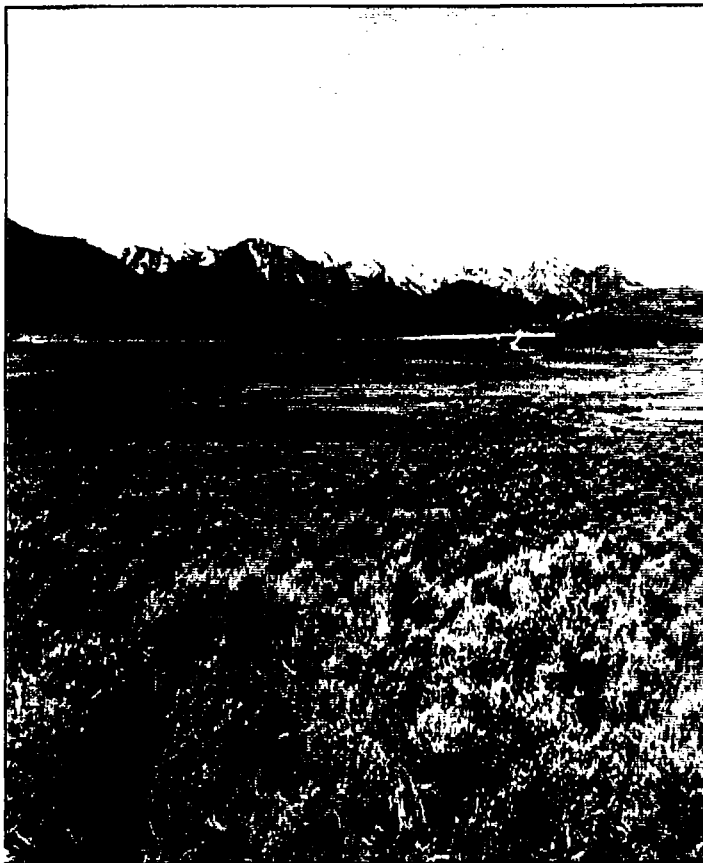
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Remedial Investigation and Feasibility Study Oversight

July 2001



Technical Oversight Report

**RESPONSE ACTION CONTRACT
FOR REMEDIAL, ENFORCEMENT OVERSIGHT, AND NON-TIME
CRITICAL REMOVAL ACTIVITIES AT SITES OF RELEASE OR
THREATENED RELEASE OF HAZARDOUS SUBSTANCES
IN EPA REGION VIII**

U.S. EPA CONTRACT NO. 68-W5-0022

**TECHNICAL OVERSIGHT REPORT - MAY 2001 SAMPLING EVENT
FOR
RICHARDSON FLAT TAILINGS SITE
SUMMIT COUNTY, UTAH**

**Work Assignment No.: 088-RSBD-0894
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**Prepared for:
U.S. Environmental Protection Agency
Region VIII
999 18th Street, Suite 500
Denver, CO 80202**

**Prepared by:
CDM Federal Programs Corporation
1331 17th Street, Suite 1050
Denver, CO 80202**

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Acronyms

CDM Federal	CDM Federal Programs Corporation
DQOs	data quality objectives
EPA	United States Environmental Protection Agency
PE	performance evaluation
PM	Project Manager
QA	quality assurance
QC	quality control
RAC	response action contract
Richardson Flat	Richardson Flat Tailings Site
RI/FS	remedial investigation/feasibility study
RL	reporting limit
RMC	Resource Management Consultants
RPDS	relative percent differences
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan, Remedial Investigation at Richardson Flat
SOPS	standard operating procedures
United Park	United Park City Mines Company
UDEQ	Utah Department of Environmental Quality

Section 1

Project Objective

CDM Federal's objective is to provide oversight and documentation of field activities conducted by United Park City Mines Company (UPCM) as part of the focused remedial investigation (RI)/feasibility study (FS). CDM Federal's sampling requirements can be found in Appendix G of the SAP. Oversight activities will help ensure that UPCM performs field investigations according to the approved site work plan, SAP, and standard operating procedures (SOPs).

Section 2

Sampling Activities Conducted by Date

2.1 May 7, 2001

CDM Federal arrived at the site at 11:00 am. Persons at the site included Kerry Gee of UPCM and three staff members from Resource Management Consultants (RMC). The field activities for the day included oversight and split sampling of surface water and depth of cover (onsite) soil. The weather was warm and sunny. Modified level D personal protection was used. CDM Federal filtered all split and duplicate dissolved surface water samples, using a Geotech Geoprobe 2 peristaltic pump (serial # E00004794), silicone tubing, and 0.45 micron disposable filters. No other field equipment was used.

2.1.1 Surface Water Sampling

Upon arrival, CDM Federal learned that RMC had begun sampling and had already sampled the two surface water locations where CDM Federal was to collect split samples according to Appendix G in the SAP. CDM Federal collected surface water samples and one duplicate at those two locations. Five bottles, as described in Table 2 of the SAP, were collected for each split and duplicate sample. CDM Federal collected all samples and filtered for dissolved metals in accordance with methods described in the SAP. All samples were kept on ice from the time of collection through shipment to the laboratory. CDM Federal conducted oversight on the final three sampling locations (CDM Federal sample locations 006, 007, and 008, RMC sample locations RF-3-2, RF-2, and RF-1). Table 1 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the locations where surface water split and duplicate samples were collected on May 7th.

Table 1 Location and Sample Numbers of CDM Federal's Split and Duplicate Surface Water Samples Collected May 7th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
RF-6-2	RF-SW-RF6-2	X		01-E2-SW-003-0
RF-6-2	RF-SW-RF6-2		X	01-E2-SW-303-0
RF-7-2	RF-SW-RF7-2	X		01-E1-SW-002-0

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

The two locations where CDM Federal, according to the SAP, was to collect split and duplicate samples had already been sampled by RMC earlier that morning. Therefore, the aliquot sequence presented in Table 3-1 of Appendix G in the SAP could not be followed for the samples collected by CDM Federal at these locations. In addition, oversight at those two locations, as well as locations RF-8, RF-5, and RF-4, was not conducted.

2.1.2 Onsite Depth of Cover Soil Sampling

RMC began the onsite soil sampling during the afternoon of May 7th. Sampling began at the northeast section of the site. Figure 5 from the SAP shows the grid pattern used to locate sampling sites. CDM Federal numbered the grid in the field starting with 001 in the northeast section. UPCM sample locations are listed on Figure 1, with CDM Federal sample locations in parenthesis. Sample locations were staked by RMC personnel prior to sampling. A shovel was used to dig a hole, not to exceed 1 foot in depth. The hole was inspected for a delineation of cover soil and tailings. If that delineation was found, a surface sample was taken at 0-2 inches and a depth sample was taken two inches above the tailings. If no delineation was found, a backhoe was used to dig a deeper hole where delineation could be found. The aliquot sequence presented in Table 3-1 of Appendix G in the SAP was followed for each split and duplicate sample. RMC collected all samples. All samples were kept on ice from the time of collection through shipment to the laboratory. Table 2 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the onsite soil locations where splits and duplicates were taken on May 7th.

Table 2 Location and Sample Numbers of CDM Federal's Split and Duplicate Onsite Soil Samples Collected May 7th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
4I	RF-ON-4I 0-2"	X		01-E2-ON-001-2
3H	RF-ON-3H 0-2"	X		01-E2-ON-005-2
3H	RF-ON-3H 0-2"		X	01-E2-ON-305-2
5G	RF-ON-5G 0-2"	X		01-E2-ON-007-2
5G	RF-ON-5G 0-2"		X	01-E2-ON-307-2

All samples collected on May 7th, were packaged and shipped in accordance with CDM Federal's SOPs presented in Appendix G of the SAP. The samples were shipped overnight to Columbia Analytical Services in Kelso, Washington where samples were analyzed for parameters listed Appendix G of the SAP.

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

CDM Federal was supposed to take a sample at location 003 (RMC 5H) according to Appendix G in the SAP. However, after digging with a backhoe, it was decided by RMC and CDM Federal that this sample location was off of the tailings impoundment. Using a random number generator, sample location 019 (RMC 3E) was selected as the alternate split sample location. This onsite soil sample split was subsequently collected on May 8th. Aliquot sequences for the duplicate samples (i.e., 005 and 007) were not followed.

2.2 May 8, 2001

CDM Federal arrived at the site at 8:30 am. Persons at the site included three staff members from RMC. The field activities for the day included oversight and split sampling of onsite soil. The weather was warm and sunny. Modified level D personal protection was used. CDM Federal did not use any field equipment on this day.

2.2.1 Onsite Depth of Cover Soil Sampling

The majority of the remaining onsite soil samples were collected on May 8th. RMC found that sample locations on the southern half of the tailings impoundment had substantial amounts of cover soil. Therefore, they decided to dig all of these holes with a backhoe. RMC collected all samples. All samples were kept on ice from the time of collection through shipment to the laboratory. Table 3 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the onsite soil locations where split samples were collected on May 8th.

Table 3 Location and Sample Numbers of CDM Federal's Split Onsite Soil Samples Collected May 8th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
2H	RF-ON-2H 0-2"	X		01-E2-ON-006-2
4G	RF-ON-4G 5-7"	X		01-E2-ON-008-7
3G	RF-ON-3G 0-2"	X		01-E2-ON-009-2
3E	RF-ON-3E 15-17"	X		01-E2-ON-019-18

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

There were no deviations from this SAP on this day.

2.3 May 9, 2001

CDM Federal arrived at the site at 8:30 am. Persons at the site included three staff members from RMC. The field activities for the day included oversight and split sampling of onsite soil, offsite soil, and test pit tailings. The weather to start the day was cloudy and cool, but later turned sunny and warm. Modified level D personal protection was used: CDM Federal did not use any field equipment on this day.

2.3.1 Onsite Depth of Cover Soil Sampling

The remaining onsite soil samples were collected on May 9th. CDM Federal decided, due to the multiple sampling events occurring simultaneously on this day, to let RMC collect the remaining onsite cover soils including three split samples for CDM Federal without oversight. RMC collected all of the split samples. RMC reported that all samples were kept on ice from the time of collection until being transferred to CDM Federal and that they followed the aliquot sequence. Once CDM Federal regained custody of the samples, they were kept on ice through shipment to the laboratory. Table 4 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the onsite soil locations where splits were collected on May 9th.

Table 4 Location and Sample Numbers of CDM Federal's Split Onsite Soil Samples Collected May 9th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
4G	RF-ON-4G 0-2"	X		01-E2-ON-008-2
1E	RF-ON-1E 0-2"	X		01-E2-ON-021-2
3D	RF-ON-3D 0-2"	X		01-E2-ON-025-2

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

According to the SAP, CDM Federal was to collect an onsite soil sample at location 016 (RMC 1F). However, this location was beneath thirty feet of topsoil recently brought to the site, and was unable to be sampled due to the limitations of the sampling equipment to reach the necessary depth. Using a random number generator, sample location 021 (RMC 1E) was selected as the alternate split sample location. CDM Federal did not conduct oversight at three locations (i.e., CDM Federal sample locations 008, 021, and 025), due to other sampling occurring simultaneously at the site. CDM Federal asked RMC to follow the aliquot sequence in Appendix G in the SAP while sampling these locations, however because no oversight was conducted at these sampling locations, CDM Federal cannot say for sure that the aliquot sequence was followed.

2.3.2 Offsite Soils

Offsite soils were collected along three transects (two south and one north) outside of the tailings impoundment. CDM Federal numbered the sample locations in the field starting with 001 on the westernmost sample location on the north transect. UPCM sample locations are listed on Figure 1, with CDM Federal sample locations in parenthesis. RMC personnel staked the sampling locations prior to sampling. A shovel was used to dig a six-inch hole, and a sample was taken at both 0-2 inches and 1-6 inches. RMC collected all samples. The aliquot sequence presented in Table 3-1 of Appendix G in the SAP was followed for each split and duplicate sample. All samples were kept on ice from the time of collection through shipment to the laboratory. Table 5 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the offsite soil locations where split and duplicate samples were taken on May 9th.

Table 5 Location and Sample Numbers of CDM Federal's Split and Duplicate Offsite Soil Samples Collected May 9th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
T3A	RF-OF-T3A 0-2"	X		01-E2-OF-019-2
T3B	RF-OF-T3B 1-6"	X		01-E2-OF-020-6
T3B	RF-OF-T3B 1-6"		X	01-E2-OF-320-6
T3F	RF-OF-T3F 1-6"	X		01-E2-OF-024-6
T3D	RF-OF-T3D 0-2"	X		01-E2-OF-022-2
T2H	RF-OF-T2H 1-6"	X		01-E2-OF-016-6
T2H	RF-OF-T2H 0-2"	X		01-E2-OF-016-2
T2C	RF-OF-T2C 0-2"	X		01-E2-OF-011-2
T2A	RF-OF-T2A 0-2"	X		01-E2-OF-009-2

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

Offsite soils were collected along three transects (two south and one north) outside of the tailings impoundment. According to the SAP, the two transects south of the tailings impoundment were suppose to have eleven sampling points. During the staking of these sample locations it was decided by Jim Christiansen (EPA) and Kerry Gee (UPCM), not to use the easternmost sampling location for these two transects because of their distance from the tailings impoundment. Therefore, instead of the 30 total sample locations originally discussed in the SAP, there were only 28.

2.3.3 Tailings Test Pits

Three tailings test pits were dug onsite. UPCM sample locations are listed on Figure 1, with CDM Federal sample locations in parenthesis. A backhoe was used to dig the tailings test pits. Sample depths were measured starting from the soil/tailings interface. Therefore, a 0-1 ft. sample was a sample taken from 0-1 ft. below the tailings/cover soil interface. RMC collected all samples. RMC reported that all samples were kept on ice from the time of collection until being transferred to CDM

Federal. Once CDM Federal regained custody of the samples, they were kept on ice through shipment to the laboratory. Table 6 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the test pit tailings locations where split and duplicate samples were taken on May 9th.

Table 6 Location and Sample Numbers of CDM Federal's Split and Duplicate Test Pit Tailing Samples Collected May 9th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
TP1	RF-TA-TP1 3'	X		01-E2-TA-001-3
TP1	RF-TA-TP1 3'		X	01-E2-TA-301-3
TP2	RF-TA-TP2 4'	X		01-E2-TA-002-4
TP3	RF-TA-TP3 2'	X		01-E2-TA-003-1

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

RMC made an in-the-field decision to dig three test pits during this sampling event instead of the planned five test pits discussed in the SAP. Therefore, based on a frequency of 20% for split samples, CDM Federal made the decision to take three split and one duplicate sample versus five split and one duplicate sample discussed in Appendix G of the SAP. The new test pit split and duplicate locations with depths are presented in Table 7.

Table 7 CDM Federal Test Pit Split and Duplicate Locations

Test Pit	Depth
Test Pit 1	2-3'
Test Pit 1	2-3' (duplicate)
Test Pit 2	3-4'
Test Pit 3	0-2'

2.4 May 10, 2001

CDM Federal arrived at the site at 8:30 am. Persons at the site included three staff members from RMC. The field activities for the day included oversight and split sampling of offsite and background soil. The weather was sunny and warm. Modified level D personal protection was used. CDM Federal did not use any field equipment on this day.

2.4.1 Offsite Soils

The remaining offsite soils were sampled during the morning of May 10th. RMC collected all samples. The aliquot sequence presented in Table 3-1 of Appendix G in the SAP was followed for each split and duplicate sample. All samples were kept on ice from the time of collection through shipment to the laboratory. Table 8 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the offsite soil locations where split and duplicate samples were taken on May 10th.

Table 8 Location and Sample Numbers of CDM Federal's Split and Duplicate Offsite Soil Samples Collected May 10th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
T1B	RF-OF-T1B 1-6"	X		01-E2-OF-002-6
T1C	RF-OF-T1C 1-6"	X		01-E2-OF-003-6
T1D	RF-OF-T1D 0-2"	X		01-E2-OF-004-2
T1D	RF-OF-T1D 0-2"		X	01-E2-OF-304-2
T1F	RF-OF-T1F 0-2"	X		01-E2-OF-006-2

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

There were no deviations from the SAP.

2.4.2 Reference (background) Soils

CDM Federal numbered in the field reference sample locations presented on Figure 2 of the SAP. CDM Federal sample locations were determined using Figure 2 and which were staked prior to sampling. UPCM sample locations along with CDM Federal sample locations in parenthesis are presented on Figure 2 of this document. A shovel was used to dig a hole, and a sample was collected at 0-2 inches. RMC collected all samples. All samples were kept on ice from the time of collection through shipment to the laboratory. Table 9 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the reference (background) soil locations where split and duplicate samples were taken on May 10th.

Table 9 Location and Sample Numbers of CDM Federal's Split and Duplicate Reference (background) Soil Samples Collected May 10th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
BG-3	RF-BG-BG3	X		01-E2-RF-003-2
BG-3	RF-BG-BG3		X	01-E2-RF-303-2
BG-4	RF-BG-BG4	X		01-E2-RF-004-2

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

Two teams were used to collect all of the reference (background) samples on May 10th. As a result, CDM Federal was unable to oversee all of the reference sampling. CDM Federal observed sampling at locations 003, 004, 006, 007, 008, and 009.

Based on draft versions of the SAP, CDM Federal assumed thirty reference (background) sampling locations. The final version of the SAP described only eleven sampling locations. Therefore, CDM Federal needed to change its planned estimate of six duplicates and one split. It was decided in the field, based on a frequency of 20% for split samples, to only collect two split samples and one duplicate sample. The first two split sample locations (003 and 004) and the duplicate location (003) presented on Table 3-1 in Appendix G of the SAP were used. In addition, because the estimated number of sampling locations had changed, the aliquot sequence presented on Table 3-1 in Appendix G of the SAP was not followed.

2.5 May 11, 2001

CDM Federal arrived at the site on at 8:00 am. Persons at the site included three staff members from RMC. The field activities for the day included oversight and split sampling of sediment in the diversion ditch. The weather was sunny and warm. Modified level D personal protection was used. CDM Federal did not use any field equipment on this day.

2.5.1 Sediment

CDM Federal numbered the sampling locations in the field starting with 001 at the westernmost location. Sample locations were determined using Figure 5 in the SAP. UPCM sample locations along with CDM Federal sample locations in parenthesis are listed on Figure 1. RMC used a stainless steel corer to collect the samples. All samples were kept on ice from the time of collection through shipment to the laboratory. Table 10 presents UPCM sample locations, the UPCM sample numbers, and CDM Federal's sample numbers for the sediment locations where splits and duplicates were taken on May 11th.

Table 10 Location and Sample Numbers of CDM Federal's Split and Duplicate Sediment Samples Collected May 11th

UPCM Sample Location	UPCM Sample Number	Split	Duplicate	CDM Federal Sample Number
SD-1	RF-SD-SD1 0-6"	X		01-E2-SD-001-6
SD-1	RF-SD-SD1 0-6"		X	01-E2-SD-301-6

All samples collected between May 8th and May 11th were packaged and shipped in accordance with CDM Federal's SOPs presented in Appendix G of the SAP. The samples were shipped overnight to Columbia Analytical Services in Kelso, Washington where samples were analyzed for parameters listed Appendix G of the SAP.

Sample Results

Appendix B of this report presents the methods, results, and laboratory remarks for both the CDM Federal and UPCM samples. In addition, usability is noted based on criteria presented in section 4.

Deviations from the SAP

Originally, CDM Federal assumed ten sediment sampling locations, however the final version of the SAP presented only six sample locations. Therefore, based on a frequency of 20% for splits, CDM Federal only took one split sample and one duplicate sample versus two split samples and one duplicate sample discussed in Appendix G of the SAP.

According to the SAP, two groundwater monitoring wells were to be installed along Silver Creek, and two piezometers were to be installed south of the tailings impoundment. It was decided by Kerry Gee (UPCM) and Jim Frike (RMC) to install two additional monitoring wells south of the tailings impoundment in place of the piezometers. Originally the plan was to have all groundwater monitoring wells installed by Friday May 11th, and sample them on Monday May 14th. However, a call to CDM Federal from RMC on Monday May 14th indicated that there were problems installing the wells, and that installation and ground water sampling would not happen before Tuesday May 29th. CDM Federal coordinated with Mo Slam of the Utah Department of Environmental Quality (UDEQ) to collect and ship the split and duplicate samples for analysis.

Section 3

Data Quality Assessment

Section 2 of Appendix G in the SAP outlines data quality objectives for this project. Table 11 presents an assessment of data quality related to field investigation oversight.

Table 11 Data Quality Assessment for Environmental Samples

DQO Step	Project Objective Description	Assessment
1: Problem Statement	The objective is to provide oversight and documentation of field activities conducted by UPCM as part of the focused RI/FS. Oversight activities will help ensure that UPCM performs field investigations according to the approved site work plan, SAP, and SOPs.	Field sampling oversight was conducted to assess the problem statement.
2: Identify the Decision	Are the data that UPCM collects during the focused RI/FS field investigation representative of current site conditions?	Surface water, onsite soil, offsite soil, background soil, and tailings samples were collected by CDM Federal personnel and analyzed and compared to UPCM data to determine whether UPCM data may represent current site conditions.
3: Inputs to the Decision	Concentrations of analytes listed in Table 2 (UPCM 2001) in samples of surface water, soil, and sediment collected by both CDM Federal and UPCM.	Samples for all media were analyzed to determine the concentration of analytes.
4: Study Boundaries	The horizontal spatial boundaries are identified in Figure 2 of UPCM's work plan (UPCM 2000). The vertical spatial boundaries are from the natural ground surface to 40 feet below ground surface. Temporal boundaries are from the time tailings were first placed on site (prior to 1950) to the present day.	Samples for all media were collected within the horizontal and vertical spatial boundaries.
5: Decision Rule	For this investigation the actual concentration values of parameters listed in Table 2 (UPCM 2001) will be used to make decisions. These concentrations in split samples of surface water, soil, and sediment compared to concentrations of the same analytes in the original samples collected by UPCM. The RPDs will be calculated if both results are positive and > 5 reporting limit. The action level for the RPDs are <35 percent for water, and <50 percent for solids. If either result is < 5 times the reporting limits, then the action level is < 2 times the reporting limits for surface water and < 4 times for solids. If either concentration is non-detect, then there are no evaluation criteria.	RPDs were calculated, where appropriate, for the CDM Federal/UPCM split samples. These RPDs were then evaluated. If either result was less than five times the reporting limit, the reporting limits were evaluated.
6: Limits of Decision Errors	For this project no "gray region" has been established. However, tolerable decision limits have been established to allow decision-makers to use professional judgment when necessary. For a water matrix, the tolerable decision limit is ± 10 percent (i.e., 25 percent - 45 percent) for RPDs and ± 1	No samples fell within the tolerable decision limits.

Section 3
Data Quality Assessment

DQO Step	Project Objective Description	Assessment
	reporting limit for results < 5 times reporting limits. For soil and sediment matrices the tolerable decision limit is ± 10 percent for RPDs and ± 1 reporting limits for results < 5 times reporting limits	
7: Optimize the Decision for Obtaining Data	Identify the most resource-effective sampling design that generates data to satisfy the DQOs in the previous steps.	The SAP (UPCM 2001) provided procedures for sampling and analysis to satisfy DQOs for this project and was approved by EPA. Deviations from the SAP did not affect quality of data collected.

Section 4

Conclusions

When taking a quality control (QC) sample (i.e., split sample) a method needs to be established to determine if the concentration of an analyte in the original sample (i.e. UPCM sample) is similar to the concentration of that analyte in the split sample (i.e., CDM Federal sample). Figure 3 presents the process established in the Contract Laboratory Guidelines for Inorganic Data Review (EPA 1994) to make such a comparison. If it is determined that the two samples are similar (i.e., acceptable), that indicates that most likely the concentration of the analyte in the original sample is representative of current site conditions. However, theoretically both samples could be wrong and therefore it cannot be said with one hundred percent confidence that data considered acceptable is representative of site conditions.

A total of 222 samples were compared using this method and eighty seven percent are considered to be acceptable based on the guidelines. Selenium was the only chemical in soil to have one hundred percent acceptability. This means that all of the original and split samples had similar concentrations and therefore the original sample concentrations are considered to be representative of current site conditions. The majority of the remaining chemicals had acceptability percentages that ranged from 83 and 92 percent. Lead and zinc, were the only chemicals to have low acceptability (68% and 69% respectively), which indicates that it is less certain that the original samples are representative of current site conditions for these chemicals.

Many of the samples with criteria outside of the acceptable range were most likely due to the fact that the sample was a mixture of tailings and soil (e.g., taken at the interface between the two media). Because these two materials may have very different concentrations of analytes, the mixture was very heterogeneous and homogeneity may not have been accomplished in the field. Also, due to the heterogeneity of the material it is difficult to determine what concentrations of analytes are actually representative of site conditions. Another possible explanation is that each lab used a different method in analyzing soil (CDM Federal Method 6020 and UPCM Method 6010). This analytical difference did not have an effect on other chemicals, however it cannot be ruled out as a possible contributor to the differences seen in the data.

Water samples meet the acceptance criteria for every chemical except total and dissolved copper. The CDM Federal water samples, however, are not considered split samples because they were collected at a later time than the UPCM samples. Therefore, they cannot be used to determine if the UPCM samples are representative of site conditions at the time of their sampling. The split and duplicate CDM Federal water samples (01-E2-SW-003-0 and 01-E2-SW-303-0) were evaluated and for each chemical there was 100% acceptability.

Section 5

Recommendations

CDM Federal recommends that two actions be taken during the next sampling event to determine why there are differences between CDM Federal and UPCM data. The first is to send a performance evaluation (PE) sample consisting of all of the relevant analytes to both laboratories. This would determine if there was a lab effect that could explain the differences in the data. The second suggestion would be to have the CDM Federal laboratory analyze twenty percent of the samples by both methods. This would determine if there was a method effect that could explain the differences in the data. At this point in time to be on the conservative side, the highest concentrations should be used as representative of current site conditions.

Tabbed Page:

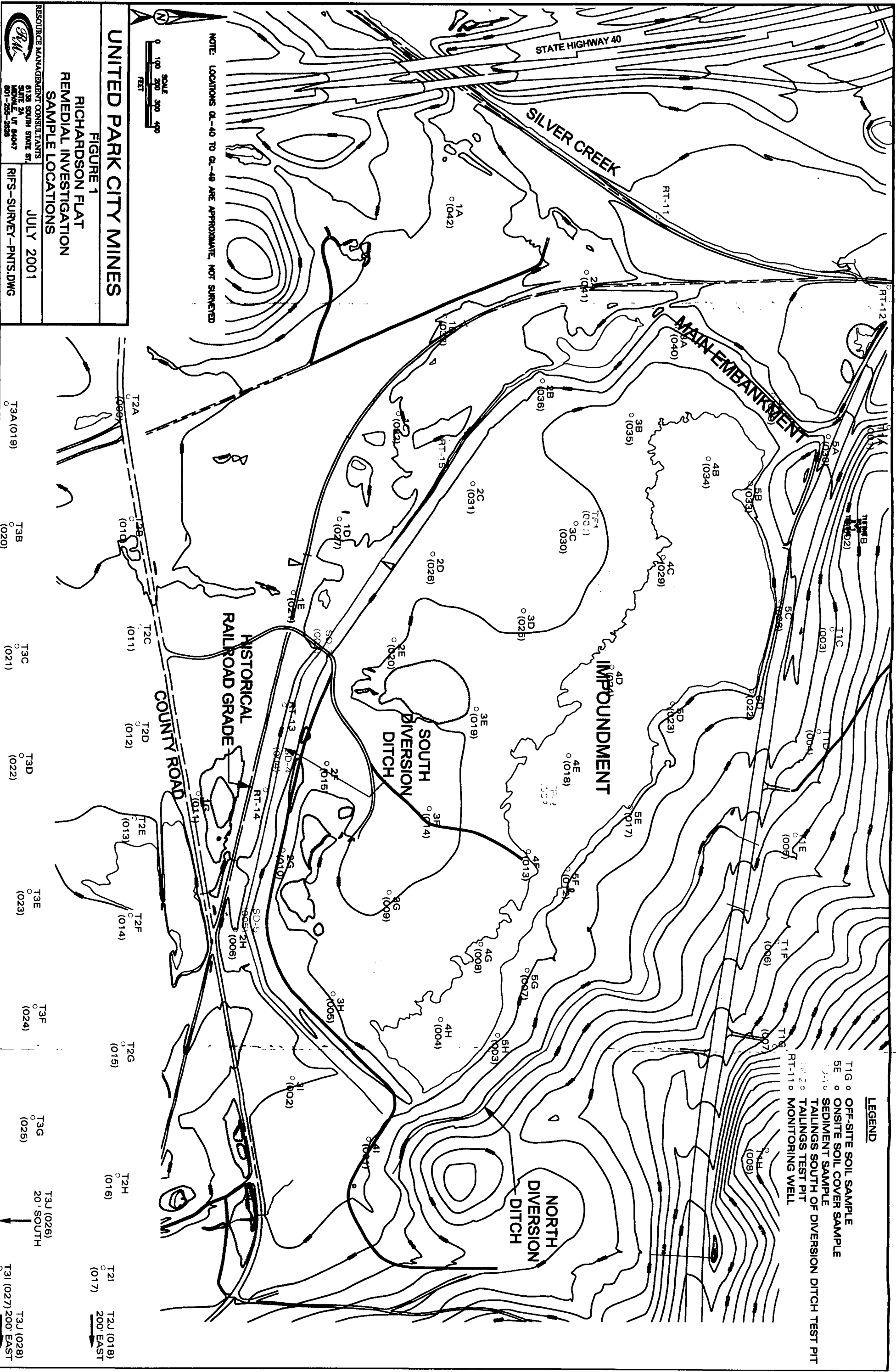
Figures

Figures

Color Map(s)

The following pages
contain color that does
not appear in the
scanned images.

To view the actual images, please
contact the Superfund Records
Center at (303) 312-6473.



UNITED PARK CITY MINES

FIGURE 1

RICHARDSDON FLAT
REMEDIAL INVESTIGATION
SAMPLE LOCATIONS

JULY 2001

B12 SOUTH STATE ST.
SUITE 201 UT 84007
801-255-2525

RIFS-SURVEY-PNTS.DWG

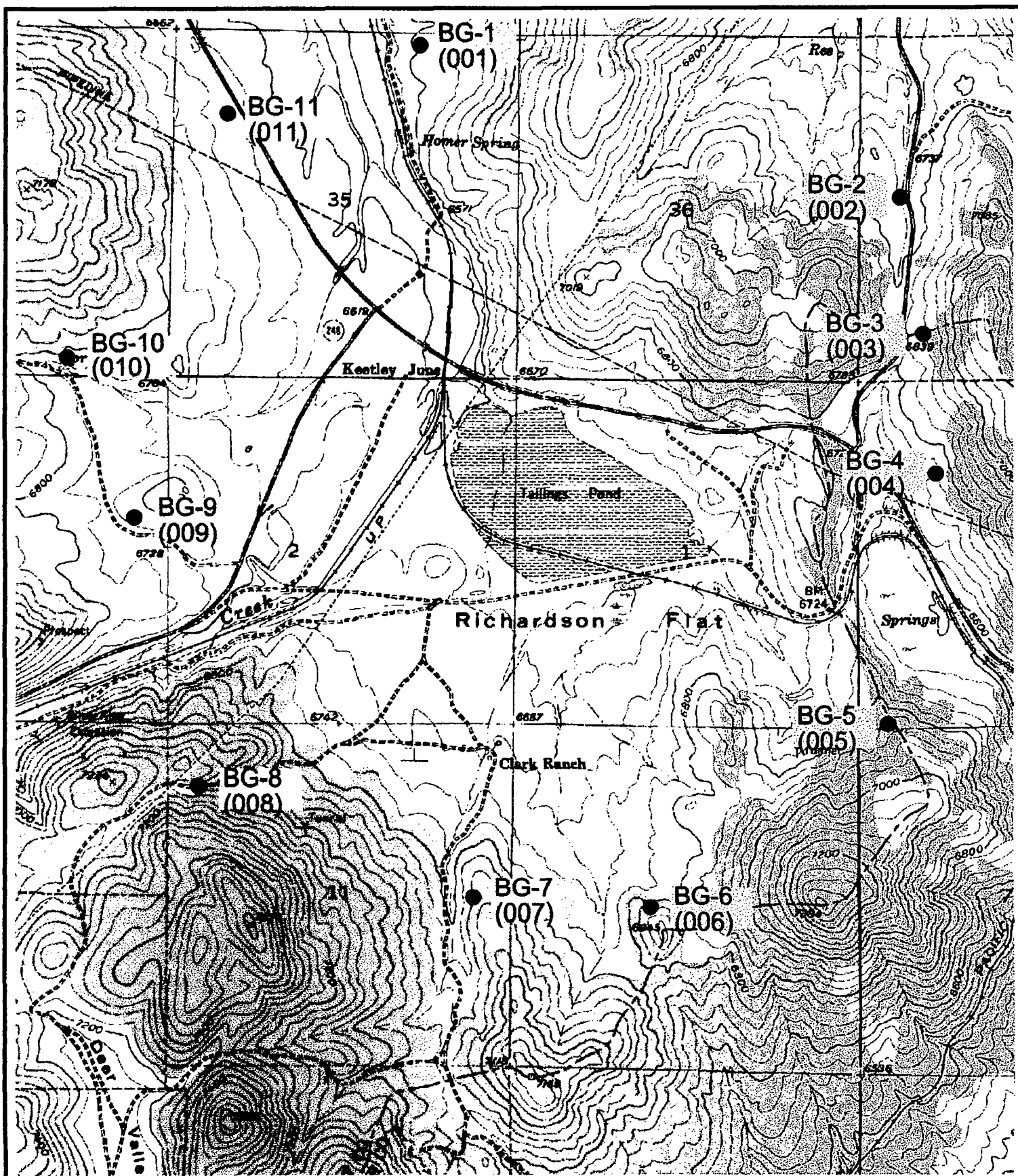



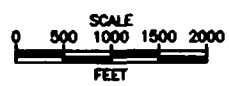
NOTE: LOCATIONS GR-40 TO GR-49 ARE APPROXIMATE, NOT SURVEYED

LEGEND

- T1G ○ OFF-SITE SOIL SAMPLE
- SE ○ ON-SITE SOIL COVER SAMPLE
- SEDIMENT SAMPLE
- TAILINGS SOUTH OF DIVERSION DITCH TEST PIT
- TAILINGS TEST PIT
- RT-11 ○ MONITORING WELL

T3U (026)
20' SOUTH
T3U (028)
200' EAST



		Date : July 2001
	<p>RMC Resource Management Consultants, Inc.</p>	Title : Background Sample Locations
	<p>Parkcity-quad-r1-sep-3-30.deg</p>	Client : United Park City Mines
		Fig. No.: Figure 2

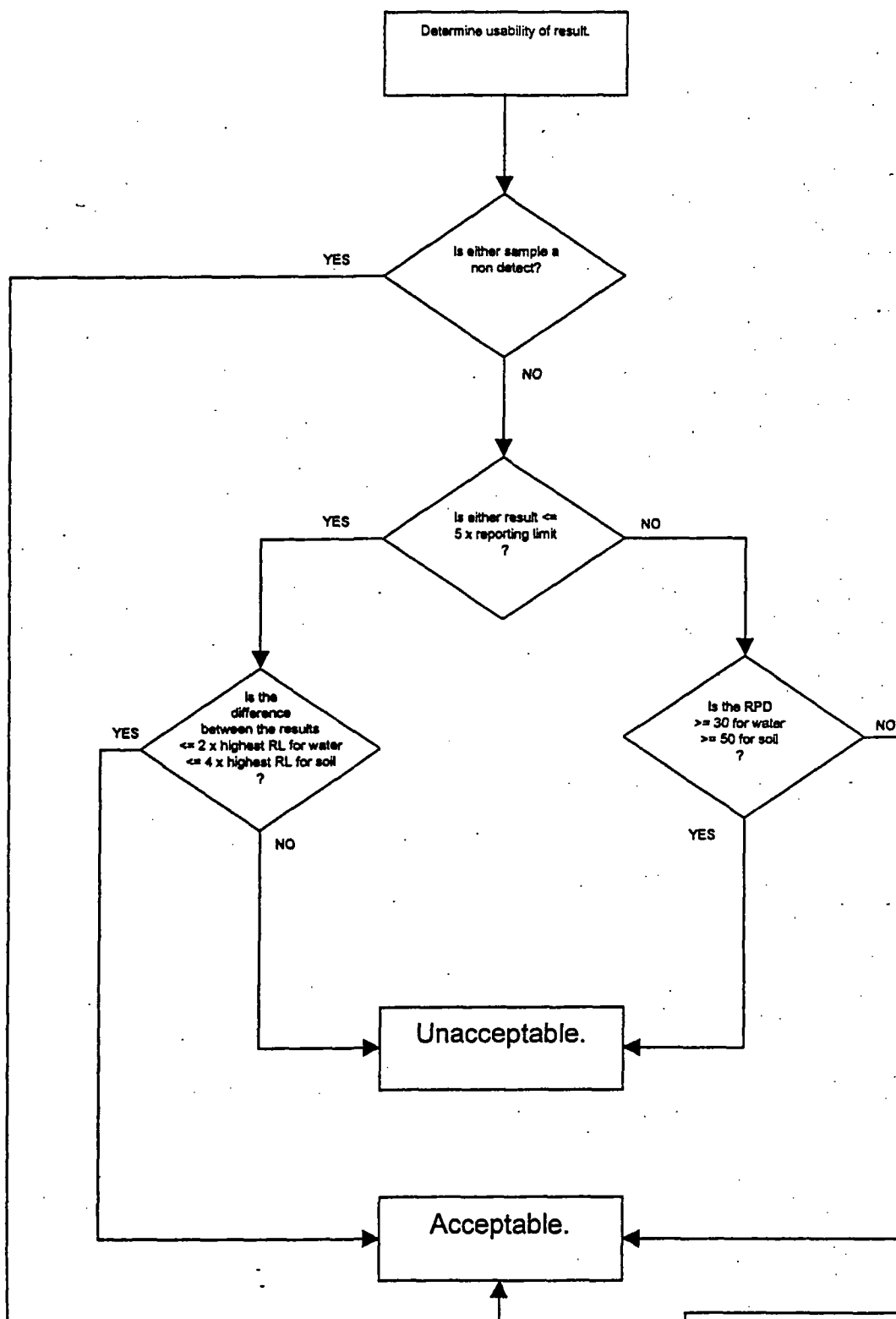


FIGURE 3

**Flow Chart for the Determination
of Data Acceptability**

Richardson Flats, Park City, Utah

CDM Federal Programs Corporation

Tabbed Page:

Appendix A

Appendix A

Data Validation Report: Trace Metals
(Sb, As, Cd, Cr, Cu, Pb, Se, Ag, Zn)
Project: Richardson Flats
May 2001 Sampling
Project Manager: Jeff Montera
Site: Richardson Flats
Sample Delivery Group (SDG): K2103393 (U8-010079)
Contract Laboratory: Columbia Analytical Services
Kelso, Washington
Reviewer: Lisa Burnley, CDM Federal
Second Reviewer: Amy Ballow, CDM Federal
Date Reviews Completed: June 21, 2001
Matrix: Soil

Data validation was performed following the guidelines in the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, February 1994).

All data are considered to be valid and acceptable including those analytes that have been qualified as estimated (J). All actions are detailed in the following report.

This report includes analytical results for eight soil samples (listed below) collected at the Richardson Flats Site during May 2001 and analyzed for trace metals as listed above by Columbia Analytical Services, Kelso, Washington.

Sample Numbers:

01-E2-ON-006-2	01-E2-OF-020-6
01-E2-ON-025-2	01-E2-OF-320-6
01-E2-OF-016-2	01-E2-OF-022-2
01-E2-OF-016-6	01-E2-OF-003-6

1. Holding Time and Sample Preservation

All holding times were met.

2. Instrument Calibration and Calibration Verification

The criteria for initial calibration verification (ICV) and continuing calibration verification (CCV) were within control limits.

3. Blank Contamination

The highest concentration of an analyte detected in a blank sample is used to determine an action level for purposes of data qualification. Blank contamination and actions are discussed below.

(A) Laboratory Blanks

Antimony was detected in the preparation blank at 0.07 mg/kg. The detected results for antimony in samples 01-E2-ON-006-2 and 01-E2-ON-025-2 were qualified as non-detected (U).

(B) Calibration Blanks

Calibration blank data met required criteria.

(C) Equipment Rinsate and Field Blanks

No equipment rinsate blanks or field blanks were analyzed with this job number.

4. Matrix Spike (MS) Analyses

The MS analyses were performed for all applicable analytes. The percent recovery (%R) for antimony at 35% was below validation QC limits of 75-125%. The results for antimony in all samples were qualified as estimated (J). All other percent recoveries were within QC limits in the MS analysis.

5. Laboratory Control Samples

The laboratory control samples were analyzed for all analytes and the results are within the required QC limits.

6. Laboratory Duplicate Sample Analyses

All calculable relative percent differences (RPDs) were less than or equal to validation limits of 35% or within the control limit of $\pm 2 \times \text{CRDL}$.

7. Field Duplicates

All field duplicate results were within acceptable control limits for sample duplicates 01-E2-OF-020-6/01-E2-OF-320-6.

8. Instrument Detection Limits

Instrument detection limits met the specified limits of this project.

9. Inductively Coupled Plasma Serial Dilution Analysis

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within 10% of the original undiluted analysis except for zinc at 11% using Method 6020. All detected zinc results by Method 6020 were estimated (J) (i.e., in all samples). It should be noted that the laboratory did not flag the zinc results on the summary Form 1s with an "E" qualifier to indicate serial dilution problems.

10. System Performance and Overall Assessment

The data from the analysis of the listed samples are usable for their intended purpose including the results that were estimated (J/UJ).

BATCH: K210339 3

[illegible]

1. If holding times are exceeded, all sample results are estimated (J)/(UJ).
2. If holding times are grossly exceeded ($\geq 2 \times$ holding time), detected results are estimated (J), and non-detected results are rejected (R).

A. Preserved w/HNO3 and cooled to 4°C
B. Cooled to 4°C
C. No Preservative

L. Burley

6/15/07

Review By: Amy BAUGH

06-20-01

ANALYTE	HOLDING TIME	PRESERVATIVE
		AQUEOUS SOIL
Metals	180 days	pH < 2 w/HNO ₃ , 4 Deg. C 4 Deg. C
Mercury	28 days	pH < 2 w/HNO ₃ , 4 Deg. C 4 Deg. C
Cyanide	14 days	pH > 12 w/NaOH, 4 Deg. C 4 Deg. C

***VERIFY ANALYSIS DATES ON REPORT MATCH RAW DATA.**

44

BATCH: K 2103393

List all ICP analytes that did not meet the percent recovery criteria for initial calibration verification (ICV) and continuing calibration verification (CCV).

[illegible]

CCV run after CRI, every 10 samples and at end of sequences? (CLP only)	Yes	No

Was a CRDL check sample (CRI) analyzed at the beginning and at the end of each sample run (CLP only)?	Yes	No
---	-----	----

COMMENTS

Actions:

ICV/CCV Actions:

	PERCENT RECOVERY				
	<75%	75-89%	90-110%	111-125%	>125%
Detected results	R	J	V	J	R
Non-detected Results	R	UJ	V	V	V

1. If the instrument was not calibrated daily and each time the instrument was set up, qualify the data as rejected (R).

Inorg98.xls

III. INORGANIC ANALYSIS WORKSHEET - BLANKS

MATRIX: Sci

BATCH: U2105393

List the highest positive AND negative blank result $\geq |DL|$ below. Use one worksheet for soil matrix and another for water matrix.

[illegible]

NOTE: Verify that the absolute value of any analyte concentration in the PB or MB is < CRDL *

Verify

One prep blank per matrix

One prep blank per batch

ICB analyzed immediately after ICV

CCB analyzed after each CCV.

Field/equipment/rinsate blanks analyzed? If so, include above if applicable to project.

COMMENTS

Actions:

1. If $|\text{Blank}| < \text{IDL}$, no action is taken.
2. If $\text{Blank} \geq \text{IDL}$, then all sample results $\geq \text{IDL}$ and $< 5 \times \text{Blank}$ are non-detected (U).
3. If $\text{Blank} = -\text{IDL}$, all sample results $\geq \text{IDL}$ and $< 5 \times |\text{Blank}|$ are estimated (J).
4. If $\text{Blank} = -\text{IDL}$ then all non-detected results are estimated (UJ).

* If blank concentration > CRDL, all detected sample results < 5 *Blanks are rejected (R).

* If blank concentration > CRDL, all detected sample results > 5 *Blanks and < 10* Blank are estimated (J).

IVA. INORGANIC ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

BATCH: _____

NOTE: The sample results can be accepted without qualification, if the sample concentrations of Al, Ca, Fe and Mg are less than or equal to the concentration found in the ICSA solution.

Examine the sample results in ug/L and list any Al, Ca, Fe or Mg results that are greater than the ICSA values.

Sample ID	Analyte	Sample Result	ICS Value	Comments
N/A				

List any analytes in the ICS AB solution that did not meet the criteria of 80-120% R.

Analyte	% R	Action	Samples Affected
Criteria met		/	

CLP Protocol Only
 Were Interference Check Samples run at the beginning and end of each sample analysis run, or a minimum of twice per 8-hour shift (whichever is more frequent)? Yes No

COMMENTS

Actions:

PERCENT RECOVERY

	<50%	50-79%	80-120%	>120%
Detected results	R	J	V	J
Non-detected results	R	UJ	V	V

*AA

BATCH: 162103393

0070

1010 11/27/2005 11/27/2005

020

Question matrix s
Yes
Question matrix s

Yes

☒ Yes

•

1

1

BATCH: _____

[illegible]

Actions:

A duplicate sample must be prepared for each sample matrix analyzed or per batch, whichever is more frequent.

BATCH: N.2101373

List all parameters that do not meet the percent recovery criteria.

[illegible]

Note:

LCS with the same matrix as samples must be prepared for each SDG.

COMMENTS

Actions:

Exception: Antimony and silver have no control limits. An aqueous LCS is not required for CN and mercury.

1. AQUEOUS

Detected results

Non-detected results

2. SOLID LCS

Recoveries stipulated by EMSL

Detected results

Non-detected results

<50%

R

R

BELOW
CONTROL
LIMITS

J

UJ

PERCENT RECOVERY

50-79%

J

UJ

80-120%

v

v

WITHIN
CONTROL
LIMITS

V

V

>120%

J

V

ABOVE
CONTROL
LIMITS

J

v

IX. INORGANIC ANALYSIS WORKSHEET -- ICP SERIAL DILUTION ANALYSIS

MATRIX: 501

BATCH: K2103595

Serial dilution criteria only applies if the original sample result is at least 50* IDL and %D > 10%.

[illegible]

INDUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.	Yes	No

Serial dilutions were not performed for the following:

COMMENTS

Actions:

Estimate (J) detected results if %D is > 10%.

NOTES

If results from diluted samples are higher than concentrated sample, matrix interference should be suspected and sample results may be biased low.

X. INORGANIC ANALYSIS WORKSHEET – SAMPLE RESULT VERIFICATION

BATCH: 12-103393

1. Describe any raw data anomalies (i.e., baseline shifts, negative absorbances, transcription or calculation errors, legibility, etc.)

None

2. List results that fall outside the linear range of the ICP instrument or the calibrated range of the AA or Cyanide instrument, and were not reanalyzed.

None

3. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? Yes No NA

NE

4. Were ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes No NA

NE

5. Were instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 months of, and preceding, the sample analyses? Yes No NA

NT

6. Were all sample results reported down to the IDL if running CLP protocol? Yes No NA

7. Were all sample results reported down to MDL if running SW-846 methods? Yes No NA

8. Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No

COMMENTS

Element	Weight (g)	Volume (mL)	Percent Solids (%)	Dilution	Result (ppm)
Pb	0.5/6	5.64	9.25	(19)	
As	0.5	17.7	19.3	(8)	
Cr	0.5	13.6	17.0	(3)	
Co	0.5	14.9	16.6	(11)	
Cu	0.5	46.5	48.3	(4)	
Pb	0.5	341	360	(5)	
Se	ND	ND	ND	(0)	
Ag	0.5	1.98	1.95	(31)	
Zn	0.5	775	708	(9)	

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103393

Project No.: U8-010079

Date Collected: 05/08/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-006-2

Lab Code: K2103393-001

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.06	5	5/29/01	5/30/01	0.37		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	1.6		
Cadmium	6020	0.06	5	5/23/01	5/29/01	0.19		
Chromium	6020	0.2	5	5/23/01	5/29/01	13.3		
Copper	6020	0.1	5	5/23/01	5/29/01	9.9		
Lead	6020	0.06	5	5/23/01	5/29/01	14.8		
Selenium	6020	1.2	5	5/23/01	5/29/01	1.2	U	
Silver	6020	0.02	5	5/29/01	5/30/01	0.21		
Zinc	6020	0.6	5	5/23/01	5/29/01	38.5		

* Solids: 85.2

Comments:

00021

12/15/01 SW-246

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103393

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-025-2

Lab Code: K2103393-002

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.06	5	5/29/01	5/30/01	0.24		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	3.1		
Cadmium	6020	0.06	5	5/23/01	5/29/01	0.39		
Chromium	6020	0.2	5	5/23/01	5/29/01	16.2		
Copper	6020	0.1	5	5/23/01	5/29/01	21.3		
Lead	6020	0.06	5	5/23/01	5/29/01	16.4		
Selenium	6020	1.2	5	5/23/01	5/29/01	1.2	U	
Silver	6020	0.02	5	5/29/01	5/30/01	0.21		
Zinc	6020	0.6	5	5/23/01	5/29/01	62.4		

% Solids: 82.9

Comments:

00022

1.26/1.44 SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103393

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-016-2

Lab Code: K2103393-003

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.06	5	5/29/01	5/30/01	0.89		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	6.1		
Cadmium	6020	0.06	5	5/23/01	5/29/01	0.62		
Chromium	6020	0.2	5	5/23/01	5/29/01	17.7		
Copper	6020	0.1	5	5/23/01	5/29/01	20.9		
Lead	6020	0.06	5	5/23/01	5/29/01	62.8		
Selenium	6020	1.2	5	5/23/01	5/29/01	1.2	U	
Silver	6020	0.02	5	5/29/01	5/30/01	0.54		
Zinc	6020	0.6	5	5/23/01	5/29/01	84.1		

% Solids: 82.5

Comments:

00023

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103393

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-016-6

Lab Code: K2103393-004

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.06	5	5/29/01	5/30/01	0.63		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	5.5		
Cadmium	6020	0.06	5	5/23/01	5/29/01	0.54		
Chromium	6020	0.2	5	5/23/01	5/29/01	22.3		
Copper	6020	0.1	5	5/23/01	5/29/01	22.8		
Lead	6020	0.06	5	5/23/01	5/29/01	59.5		
Selenium	6020	1.2	5	5/23/01	5/29/01	1.2	U	
Silver	6020	0.02	5	5/29/01	5/30/01	0.47		
Zinc	6020	0.6	5	5/23/01	5/29/01	91.4		

% Solids: 81.6

Comments:

00024

1026/15/01 SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103393

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-020-6

Lab Code: K2103393-005

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.05	5	5/29/01	5/30/01	9.25		N
Arsenic	6020	0.5	5	5/23/01	5/29/01	19.3		
Cadmium	6020	0.05	5	5/23/01	5/29/01	14.0		
Chromium	6020	0.2	5	5/23/01	5/29/01	16.6		
Copper	6020	0.1	5	5/23/01	5/29/01	48.5		
Lead	6020	0.05	5	5/23/01	5/29/01	360		
Selenium	6020	1.1	5	5/23/01	5/29/01	1.1	U	
Silver	6020	0.02	5	5/29/01	5/30/01	1.98		
Zinc	6020	2.7	25	5/23/01	5/30/01	775		

% Solids: 75.9

Comments:

00025

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103393

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-320-6

Lab Code: K2103393-006

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.05	5	5/29/01	5/30/01	5.64		N
Arsenic	6020	0.5	5	5/23/01	5/29/01	17.7		
Cadmium	6020	0.05	5	5/23/01	5/29/01	13.6		
Chromium	6020	0.2	5	5/23/01	5/29/01	14.9		
Copper	6020	0.1	5	5/23/01	5/29/01	46.5		
Lead	6020	0.05	5	5/23/01	5/29/01	341		
Selenium	6020	1.1	5	5/23/01	5/29/01	1.1	U	
Silver	6020	0.02	5	5/29/01	5/30/01	1.45		
Zinc	6020	2.7	25	5/23/01	5/30/01	708		

% Solids: 77.3

Comments:

00026

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103393

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-022-2

Lab Code: K2103393-007

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.06	5	5/29/01	5/30/01	1.05		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	4.2		
Cadmium	6020	0.06	5	5/23/01	5/29/01	0.66		
Chromium	6020	0.2	5	5/23/01	5/29/01	17.6		
Copper	6020	0.1	5	5/23/01	5/29/01	25.8		
Lead	6020	0.06	5	5/23/01	5/29/01	32.2		
Selenium	6020	1.2	5	5/23/01	5/29/01	1.2	U	
Silver	6020	0.02	5	5/29/01	5/30/01	0.52		
Zinc	6020	0.6	5	5/23/01	5/29/01	98.3		

% Solids: 70.8

Comments:

00027

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103393

Project No.: U8-010079

Date Collected: 05/10/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-003-6

Lab Code: K2103393-008

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.06	5	5/29/01	5/30/01	0.45		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	4.0		
Cadmium	6020	0.06	5	5/23/01	5/29/01	0.40		
Chromium	6020	0.2	5	5/23/01	5/29/01	19.9		
Copper	6020	0.1	5	5/23/01	5/29/01	18.0		
Lead	6020	0.06	5	5/23/01	5/29/01	30.8		
Selenium	6020	1.1	5	5/23/01	5/29/01	1.1	U	
Silver	6020	0.02	5	5/29/01	5/30/01	0.34		
Zinc	6020	0.6	5	5/23/01	5/29/01	79.3		

% Solids: 88.7

Comments:

00028

SW-846

Data Validation Report: Trace Metals
(As and Pb)
Project: Richardson Flats
May 2001 Sampling
Project Manager: Jeff Montera
Site: Richardson Flats
Sample Delivery Group (SDG): K2103392 (U8-010079)
Contract Laboratory: Columbia Analytical Services
Kelso, Washington
Reviewer: Lisa Burnley, CDM Federal
Second Reviewer: Amy Ballow, CDM Federal
Date Reviews Completed: June 21, 2001
Matrix: Soil

Data validation was performed following the guidelines in the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, February 1994).

All data are considered to be valid and acceptable including those analytes that have been qualified as estimated (J). All actions are detailed in the following report.

This report includes analytical results for fourteen soil samples (listed below) collected at the Richardson Flats Site during May 2001 and analyzed for arsenic and lead metals as listed above by Columbia Analytical Services, Kelso, Washington.

Sample Numbers:

01-E2-ON-008-2	01-E2-OF-002-6
01-E2-ON-009-2	01-E2-OF-004-2
01-E2-ON-021-2	01-E2-OF-304-2
01-E2-OF-009-6	01-E2-OF-006-2
01-E2-OF-011-2	01-E2-RF-003-2
01-E2-OF-019-2	01-E2-RF-303-2
01-E2-OF-024-6	01-E2-RF-004-2

1. Holding Time and Sample Preservation

All holding times were met.

2. Instrument Calibration and Calibration Verification

The criteria for initial calibration verification (ICV) and continuing calibration verification (CCV) were within control limits.

3. Blank Contamination

The highest concentration of an analyte detected in a blank sample is used to determine an action level for purposes of data qualification. Blank contamination and actions are discussed below.

(A) Laboratory Blanks

None of the target analytes were detected in the method blanks associated with these samples.

(B) Calibration Blanks

Calibration blank data met required criteria.

(C) Equipment Rinsate and Field Blanks

No equipment rinsate blanks or field blanks were analyzed with this job number.

4. Matrix Spike (MS) Analyses

The MS analyses were performed for all applicable analytes. The percent recoveries (%Rs) for arsenic and lead were within the required QC limits.

5. Laboratory Control Samples

The laboratory control sample results for arsenic and lead were within the required QC limits.

6. Laboratory Duplicate Sample Analyses

All calculable relative percent differences (RPDs) were less than or equal to validation limits of 35% or within the control limit of $\pm 2 \times \text{CRDL}$.

7. Field Duplicates

All field duplicate results were within acceptable control limits for sample pairs 01-E2-OF-004-2/01-E2-OF-304-2 and 01-E2-RF-003-2/01-E2-RF-303-2.

8. Instrument Detection Limits

Instrument detection limits met the specified limits of this project.

9. Inductively Coupled Plasma Serial Dilution Analysis

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within 10% of the original undiluted analysis.

10. System Performance and Overall Assessment

The data from the analysis of the listed samples are usable for their intended purpose.

BATCH: 12103592

[illegible]

As & Pb only 6020'

Date: 06-20-01

ANALYTE	HOLDING TIME	PRESERVATIVE
		AQUEOUS SOIL
Metals	180 days	pH < 2 w/HNO ₃ , 4 Deg. C 4 Deg. C
Mercury	28 days	pH < 2 w/HNO ₃ , 4 Deg. C 4 Deg. C
Cyanide	14 days	pH > 12 w/NaOH, 4 Deg. C 4 Deg. C

Inorg98.xls

44

BATCH: K2103392

List all ICP analytes that did not meet the percent recovery criteria for initial calibration verification (ICV) and continuing calibration verification (CCV).

[illegible]

Actions:

ICV/CCV Actions:

	PERCENT RECOVERY				
	<75%	75-89%	90-110%	111-125%	>125%
Detected results	R	J	V	J	R
Non-detected Results	R	UJ	V	V	V

1. If the Instrument was not calibrated daily and each time the Instrument was set up, qualify the data as rejected (R).

Inorg98.xls

III. INORGANIC ANALYSIS WORKSHEET – BLANKS

MATRIX: Si

BATCH: U 2105392

List the highest positive AND negative blank result $\geq |DL|$ below. Use one worksheet for soil matrix and another for water matrix.

[illegible]

NOTE: Verify that the absolute value of any analyte concentration in the PB or MB is < CRDL *

Verify

One prep blank per matrix

One prep blank per batch

ICB analyzed immediately after ICV

CCB analyzed after each CCV.

Field/equipment/rinsate blanks analyzed? If so, include above if applicable to project.

COMMENTS

Actions:

1. If $|Blank| < IDL$, no action is taken.
2. If $Blank \geq IDL$, then all sample results $\geq IDL$ and $< 5 \cdot Blank$ are non-detected (U).
3. If $Blank = -IDL$, all sample results $\geq IDL$ and $< 5 \cdot |Blank|$ are estimated (J).
4. If $Blank = -IDL$ then all non-detected results are estimated (UJ).

* If blank concentration > CRDL, all detected sample results < 5 *Blanks are rejected (R).

* If blank concentration > CRDL, all detected sample results > 5 *Blanks and < 10* Blank are estimated (J).

IVA. INORGANIC ANALYSIS WORKSHEET – ICP INTERFERENCE CHECK SAMPLE

BATCH: _____

NOTE: The sample results can be accepted without qualification, if the sample concentrations of Al, Ca, Fe and Mg are less than or equal to the concentration found in the ICSA solution.

Examine the sample results in ug/L and list any Al, Ca, Fe or Mg results that are greater than the ICSA values.

Sample ID	Analyte	Sample Result	ICS Value	Comments

List any analytes in the ICS AB solution that did not meet the criteria of 80-120% R.

Analyte	% R	Action	Samples Affected

CLP Protocol Only

Were Interference Check Samples run at the beginning and end of each sample analysis run, or a minimum of twice per 8-hour shift (whichever is more frequent)? Yes No

COMMENTS

Actions:

PERCENT RECOVERY

	<50%	50-79%	80-120%	>120%
Detected results	R	J	V	J
Non-detected results	R	UJ	V	V

MATRIX: 52.1

BATCH: U2103392

[illegible][illegible]

Inorg98.xls

BATCH: K 2105392

[illegible]

Exception: Antimony and silver have no control limits. An aqueous LCS is not required for CN and mercury.

Recoveries stipulated by EMSL

V

V

BATCH: U. 2103392

[illegible]

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.	Yes	No

COMMENTS

Estimate (J) detected results if %D is > 10%.

If results from diluted samples are higher than concentrated sample, matrix interference should be suspected and sample results may be biased low.

X. INORGANIC ANALYSIS WORKSHEET – SAMPLE RESULT VERIFICATION

BATCH: _____

1. Describe any raw data anomalies (i.e., baseline shifts, negative absorbances, transcription or calculation errors, legibility, etc.)

none

2. List results that fall outside the linear range of the ICP instrument or the calibrated range of the AA or Cyanide instrument, and were not reanalyzed.

none

3. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? Yes No NA

NI

4. Were ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes No NA

NI

5. Were instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 months of, and preceding, the sample analyses? Yes No NA

NI

6. Were all sample results reported down to the IDL if running CLP protocol? Yes No NA

NA

7. Were all sample results reported down to MDL if running SW-846 methods? Yes No NA

Yes

8. Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No

Yes

COMMENTS

Dups

93

26

004-2

5.7

82.3

304-2

4.4

62.8

26%

27%

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-008-2

Lab Code: K2103392-001

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.5	5	5/24/01	5/29/01	2.8		
Lead	6020	0.05	5	5/24/01	5/29/01	19.0		

% Solids: 76.8

Comments:

U8 6/14/01 010020

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: US-010079

Date Collected: 05/08/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-009-2

Lab Code: K2103392-002

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.5	5	5/24/01	5/29/01	10.8		
Lead	6020	0.05	5	5/24/01	5/29/01	24.0		

% Solids: 93.9

Comments:

00021

W36/19/01

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-021-2

Lab Code: K2103392-003

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	9.8		
Lead	6020	0.06	5	5/24/01	5/29/01	148		

% Solids: 85.3

Comments:

05/15/01 00022
SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-009-6

Lab Code: K2103392-004

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	11.3		
Lead	6020	0.06	5	5/24/01	5/29/01	136		

% Solids: 83.0

Comments:

126/4/01 00023

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-011-2

Lab Code: K2103392-005

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.5	5	5/24/01	5/29/01	76.3		
Lead	6020	1.10	100	5/24/01	5/29/01	2140		

* Solids: 76.0

Comments:

034/11 00024

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-019-2

Lab Code: K2103392-006

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	6.3		
Lead	6020	0.06	5	5/24/01	5/29/01	58.3		

% Solids: 88.7

Comments:

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-024-6

Lab Code: K2103392-007

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	3.1		
Lead	6020	0.06	5	5/24/01	5/29/01	17.2		

% Solids: 82.0

Comments:

36/4/01 00026

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/10/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-002-6

Lab Code: K2103392-008

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	5.6		
Lead	6020	0.06	5	5/24/01	5/29/01	69.0		

% Solids: 89.6

Comments:

00027

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/10/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-004-2

Lab Code: K2103392-009

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	5.7		
Lead	6020	0.06	5	5/24/01	5/29/01	82.3		

% Solids: 84.0

Comments:

00028
W36/19a
SW-216

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/10/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-304-2

Lab Code: K2103392-010

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	4.4		
Lead	6020	0.06	5	5/24/01	5/29/01	62.8		

% Solids: 86.7

Comments:

00029

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/10/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-OF-006-2

Lab Code: K2103392-011

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	5.7		
Lead	6020	0.06	5	5/24/01	5/29/01	28.9		

% Solids: 88.7

Comments:

00030

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/10/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-RF-003-2

Lab Code: K2103392-012

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	6.4		
Lead	6020	0.06	5	5/24/01	5/29/01	24.5		

% Solids: 84.9

Comments:

00031
SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/10/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-RF-303-2

Lab Code: K2103392-013

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	6.2		
Lead	6020	0.06	5	5/24/01	5/29/01	22.3		

% Solids: 85.4

Comments:

00032

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103392

Project No.: U8-010079

Date Collected: 05/10/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-RF-004-2

Lab Code: K2103392-014

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/24/01	5/29/01	4.4		
Lead	6020	0.06	5	5/24/01	5/29/01	26.4		

% Solids: 83.8

Comments:

11/00033

Data Validation Report: Trace Metals
(Al, Sb, As, Cd, Cr, Cu, Fe, Pb, Se, Ag, Zn)
Project: Richardson Flats
May 2001 Sampling
Project Manager: Jeff Montera
Site: Richardson Flats
Sample Delivery Group (SDG): K2103391 (U8-010079)
Contract Laboratory: Columbia Analytical Services
Kelso, Washington
Reviewer: Lisa Burnley, CDM Federal
Second Reviewer: Amy Ballow, CDM Federal
Date Reviews Completed: June 21, 2001
Matrix: Soil

Data validation was performed following the guidelines in the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, February 1994).

All data are considered to be valid and acceptable including those analytes that have been qualified as estimated (J). All actions are detailed in the following report.

This report includes analytical results for eight soil samples (listed below) collected at the Richardson Flats Site during May 2001 and analyzed for trace metals as listed above by Columbia Analytical Services, Kelso, Washington.

Sample Numbers:

01-E2-ON-008-7	01-E2-TA-002-4
01-E2-ON-019-18	01-E2-TA-003-1
01-E2-TA-001-3	01-E2-SD-001-6
01-E2-TA-301-3	01-E2-SD-301-6

1. Holding Time and Sample Preservation

All holding times were met.

2. Instrument Calibration and Calibration Verification

The criteria for initial calibration verification (ICV) and continuing calibration verification (CCV) were within control limits.

3. Blank Contamination

The highest concentration of an analyte detected in a blank sample is used to determine an action level for purposes of data qualification. Blank contamination and actions are discussed below.

(A) Laboratory Blanks

Antimony was detected in the preparation blank at 0.07 mg/kg. The detected results for antimony in samples 01-E2-ON-008-7 and 01-E2-ON-019-18 were qualified as non-detected (U).

(B) Calibration Blanks

Calibration blank data met required criteria.

(C) Equipment Rinsate and Field Blanks

No equipment rinsate blanks or field blanks were analyzed with this job number.

4. Matrix Spike (MS) Analyses

The MS analyses were performed for all applicable analytes. The percent recovery (%R) for antimony at 34% was below validation QC limits of 75-125%. The results for antimony in all samples were qualified as estimated (J/UJ). All other percent recoveries were within QC limits in the MS analysis.

5. Laboratory Control Samples

The laboratory control samples were analyzed for all analytes and the results are within the required QC limits.

6. Laboratory Duplicate Sample Analyses

All calculable relative percent differences (RPDs) were less than or equal to validation limits of 35% or within the control limit of $\pm 2 \times \text{CRDL}$.

7. Field Duplicates

Field duplicate analyses were performed on 01-E2-TA-001-3/01-E2-TA-301-3 and 01-E2-SD-001-6/01-E2-SD-301-6. The RPD for selenium at 200% in samples 01-E2-TA-001-3/01-E2-TA-301-3 and the RPD for cadmium at 51% in samples 01-E2-SD-001-6/01-E2-SD-301-6 were outside control limits. No qualification is taken on field duplicate results.

8. Instrument Detection Limits

Instrument detection limits met the specified limits of this project.

9. Inductively Coupled Plasma Serial Dilution Analysis

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within 10% of the original undiluted analysis except for zinc at 11% using Method 6020. All detected zinc results by Method 6020 were estimated (J) (i.e., in samples 01-E2-ON-008-7 and 01-E2-ON-019-18). It should be noted that the laboratory did not flag the zinc results on the summary Form 1s with an "E" qualifier to indicate serial dilution problems.

10. System Performance and Overall Assessment

The data from the analysis of the listed samples are usable for their intended purpose including the results that were estimated (J/UJ).

I. INORGANIC ANALYSIS WORKSHEET -- HOLDING TIMES

BATCH: K2103391

List all analytes which do not meet holding time criteria

[illegible]

COMMENTS Rev'd 5/14 6010 & 6020 Total metals

Al, Sb, As, Cd, Cr, Cu, Fe, Pb, Se, Ag, Zn

Actions:

1. If holding times are exceeded, all sample results are estimated (JY)/(UJ).
2. If holding times are grossly exceeded ($\geq 2 \times$ holding time), detected results are estimated (J), and non-detected results are rejected (R).

Preservatives:

- A. Preserved w/HNO3 and cooled to 4°C
B. Cooled to 4°C
C. No Preservative

Validated by:

led by: L. Burdick

Date:

Date 6/15/17

Review By:

Amy Ballan

Date:

06-20-01

ANALYTE	HOLDING TIME	PRESERVATIVE	
		AQUEOUS	SOIL
Metals	180 days	pH < 2 w/HNO ₃ , 4 Deg. C	4 Deg. C
Mercury	28 days	pH < 2 w/HNO ₃ , 4 Deg. C	4 Deg. C
Cyanide	14 days	pH > 12 w/NaOH, 4 Deg. C	4 Deg. C

Holding Time = Analysis Date - Collection Date

***VERIFY ANALYSIS DATES ON REPORT MATCH RAW DATA.**

4 AA

K2105391

List all ICP analytes that did not meet the percent recovery criteria for initial calibration verification (ICV) and continuing calibration verification (CCV).

[illegible]

Actions:

ICV/CCV Actions:

	PERCENT RECOVERY				
	<75%	75-89%	90-110%	111-125%	>125%
Detected results	R	J	V	J	R
Non-detected Results	R	UJ	V	V	V

1. If the instrument was not calibrated daily and each time the instrument was set up, qualify the data as rejected (R).

Inorg98.xls

III. INORGANIC ANALYSIS WORKSHEET – BLANKS

MATRIX: 50.1

BATCH: K2103391

List the highest positive AND negative blank result $\geq |DL|$ below. Use one worksheet for soil matrix and another for water matrix.

[illegible]

NOTE: Verify that the absolute value of any analyte concentration in the PB or MB is < CRDL *

Verify

One prep blank per matrix

One prep blank per batch

ICB analyzed immediately after ICV

CCB analyzed after each CCV.

Field/equipment/rinsate blanks analyzed? If so, include above if applicable to project.

COMMENTS

Actions:

1. If $|\text{Blank}| < \text{IDL}$, no action is taken.
2. If $\text{Blank} \geq \text{IDL}$, then all sample results $\geq \text{IDL}$ and $< 5 \times \text{Blank}$ are non-detected (U).
3. If $\text{Blank} = -\text{IDL}$, all sample results $\geq \text{IDL}$ and $< 5 \times |\text{Blank}|$ are estimated (J).
4. If $\text{Blank} = -\text{IDL}$ then all non-detected results are estimated (JJ).

* If blank concentration > CRDL, all detected sample results < 5 *Blanks are rejected (R).

* If blank concentration > CRDL, all detected sample results > 5 *Blanks and < 10* Blank are estimated (J).

IVA. INORGANIC ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

BATCH: K2103591

NOTE: The sample results can be accepted without qualification, if the sample concentrations of Al, Ca, Fe and Mg are less than or equal to the concentration found in the ICSA solution.

Examine the sample results in ug/L and list any Al, Ca, Fe or Mg results that are greater than the ICSA values.

Sample ID	Analyte	Sample Result	ICS Value	Comments

List any analytes in the ICS AB solution that did not meet the criteria of 80-120% R.

Analyte	% R	Action	Samples Affected

CLP Protocol Only

Were Interference Check Samples run at the beginning and end of each sample analysis run, or a minimum of twice per 8-hour shift (whichever is more frequent)? Yes No

COMMENTS

Actions:

PERCENT RECOVERY

	<50%	50-79%	80-120%	>120%
Detected results	R	J	V	J
Non-detected results	R	UJ	V	V

BATCH: K2103371

If the sample result exceeds the spike added by a factor of 4 or more, no action is taken.

kurz sein 70-130 \Rightarrow Evaluat. umg. 75-125 ✓

V

Inorg98.xls

VI. INORGANIC ANALYSIS WORKSHEET -- LABORATORY DUPLICATES

MATRIX: So, 1

BATCH: 112103391

List all parameters that do not meet RPD or CRDL criteria.

[illegible]

COMMENTS

Actions:

1. AQUEOUS

If both sample values > 5*CRDL, estimate (J/UJ) all sample results of the same matrix if the RPD is > 20%.

If either sample value $< 5^*CRDL$, and the difference between the duplicate and the original is $> CRDL$, estimate (J)/(UJ) all sample results of the same

2. SOLID

If both sample value > 5°CRDL, estimate (J/UJ) all sample results of the same matrix if the RPD is > 35%.

If either sample value $< 5 \times \text{CRDL}$, and the difference between the duplicate and the original is $> 2 \times \text{CRDL}$, estimate $(J)/(UJ)$ all sample results of the

Difference = |Sample result - Duplicate sample result|

Include outliers for field duplicates (if applicable)

Note

A duplicate sample must be prepared for each sample matrix analyzed or per batch, whichever is more frequent.

BATCH: K2105391

[illegible]

Exception: Antimony and silver have no control limits. An aqueous LCS is not required for CN and mercury.

Recoveries stipulated by EMSL

ABOVE
CONTROL
LIMITS

MATRIX:

BATCH: K 210559 1

[illegible]

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.	Yes	No

COMMENTS

Actions:

Estimate (J) detected results if %D is > 10%.

NOTES

If results from diluted samples are higher than concentrated sample, matrix interference should be suspected and sample results may be biased low.

X. INORGANIC ANALYSIS WORKSHEET -- SAMPLE RESULT VERIFICATION

BATCH: _____

1. Describe any raw data anomalies (i.e., baseline shifts, negative absorbances, transcription or calculation errors, legibility, etc.)

None

2. List results that fall outside the linear range of the ICP instrument or the calibrated range of the AA or Cyanide instrument, and were not reanalyzed.

None

3. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? Yes No NA

Not Indicated

4. Were ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes No NA

Not Indicated

5. Were instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 months of, and preceding, the sample analyses? Yes No NA

NI

6. Were all sample results reported down to the IDL if running CLP protocol? Yes No NA

Yes

7. Were all sample results reported down to MDL if running SW-846 methods? Yes No NA

Yes

8. Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No

Yes

COMMENTS

	6010	6020	3	4	47	48
Pb 6010/6020	✓ Al	✓ Sb	Al 1540 1450 (16)	4320	5180 (19)	
Fe 6010/6020	✓ Fe	✓ As	Sb 918 10.9 (17)	77	694 (10)	
#1	✓ Pb	✓ Cd	Pb 244 240 (18)	92.1	151 (12)	
	✓ Zn	✓ Cr	Cr (C) 25.8 22.6 (21)	45.7	77	51
		✓ Cu	Cu 5.8 4.3 (25)	8	10.5	(27)
		✓ Pb	Cu 219 279 (22)	117	185	(16)
		✓ Se	Fe 62200 6100 (11)	22600	27800	(21)
		✓ Ag	Pb 3650 3050 (19)	2470	3310	(27)
		✓ Zn	Se 1.2 NO (21)	5.9	7.0	(21)
			Ag 7.10 6.58 (12)	11.6		(11)
			Zn 4760 4320 (16)	9350	11200	(16)

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103391

Project No.: U8-010079

Date Collected: 05/08/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-008-7

Lab Code: K2103391-001

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	11.0	2	5/29/01	5/30/01	21600		
Antimony	6020	0.05	5	5/29/01	5/30/01	0.31		N
Arsenic	6020	0.5	5	5/23/01	5/29/01	2.6		
Cadmium	6020	0.05	5	5/23/01	5/29/01	0.55		
Chromium	6020	0.2	5	5/23/01	5/29/01	15.1		
Copper	6020	0.1	5	5/23/01	5/29/01	24.4		
Iron	6010B	4.4	2	5/29/01	5/30/01	20300		
Lead	6020	0.05	5	5/23/01	5/29/01	17.6		
Selenium	6020	1.1	5	5/23/01	5/29/01	1.1	U	
Silver	6020	0.02	5	5/29/01	5/30/01	0.30		
Zinc	6020	0.5	5	5/23/01	5/29/01	64.0		

% Solids: 76.0

Comments:

00020

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103391

Project No.: U8-010079

Date Collected: 05/08/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-019-18

Lab Code: K2103391-002

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	12.2	2	5/29/01	5/30/01	15100		
Antimony	6020	0.06	5	5/29/01	5/30/01	0.46		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	4.0		
Cadmium	6020	0.06	5	5/23/01	5/29/01	0.45		
Chromium	6020	0.2	5	5/23/01	5/29/01	13.3		
Copper	6020	0.1	5	5/23/01	5/29/01	15.8		
Iron	6010B	4.9	2	5/29/01	5/30/01	17100		
Lead	6020	0.06	5	5/23/01	5/29/01	35.1		
Selenium	6020	1.2	5	5/23/01	5/29/01	1.2	U	
Silver	6020	0.02	5	5/29/01	5/30/01	0.31		
Zinc	6020	0.6	5	5/23/01	5/29/01	72.1		

% Solids: 81.7

Comments:

00021

1/13/01/04 SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103391

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-TA-001-3

Lab Code: K2103391-003

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	11.2	2	5/29/01	5/30/01	1540		
Antimony	6020	0.06	5	5/29/01	5/30/01	9.18		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	249		
Cadmium	6020	0.06	5	5/23/01	5/29/01	28.8		
Chromium	6020	0.2	5	5/23/01	5/29/01	5.8		
Copper	6020	0.1	5	5/23/01	5/29/01	349		
Iron	6010B	4.5	2	5/29/01	5/30/01	62200		
Lead	6010B	22.4	2	5/29/01	5/30/01	3650		
Selenium	6020	1.1	5	5/23/01	5/29/01	1.2		
Silver	6020	0.02	5	5/29/01	5/30/01	7.10		
Zinc	6010B	2.2	2	5/29/01	5/30/01	4760		

% Solids: 74.3

Comments:

00022

SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103391

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-TA-301-3

Lab Code: K2103391-004

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	12.5	2	5/29/01	5/30/01	1450		
Antimony	6020	0.06	5	5/29/01	5/30/01	10.9		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	201		
Cadmium	6020	0.06	5	5/23/01	5/29/01	22.6		
Chromium	6020	0.3	5	5/23/01	5/29/01	4.3		
Copper	6020	0.1	5	5/23/01	5/29/01	279		
Iron	6010B	5.0	2	5/29/01	5/30/01	61500		
Lead	6010B	25.0	2	5/29/01	5/30/01	3050		
Selenium	6020	1.3	5	5/23/01	5/29/01	1.3	U	
Silver	6020	0.03	5	5/29/01	5/30/01	6.58		
Zinc	6010B	2.5	2	5/29/01	5/30/01	4300		

% Solids: 80.1

Comments:

00023.

SW-846

METALS

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INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103391

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-TA-002-4

Lab Code: K2103391-005

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	11.1	2	5/29/01	5/30/01	1220		
Antimony	6020	0.06	5	5/29/01	5/30/01	118		N
Arsenic	6020	0.6	5	5/23/01	5/29/01	192		
Cadmium	6020	0.06	5	5/23/01	5/29/01	31.9		
Chromium	6020	0.2	5	5/23/01	5/29/01	9.3		
Copper	6020	0.1	5	5/23/01	5/29/01	168		
Iron	6010B	4.4	2	5/29/01	5/30/01	30600		
Lead	6010B	22.2	2	5/29/01	5/30/01	2970		
Selenium	6020	1.1	5	5/23/01	5/29/01	9.4		
Silver	6020	0.02	5	5/29/01	5/30/01	17.8		
Zinc	6010B	2.2	2	5/29/01	5/30/01	4480		

% Solids: 75.2

Comments:

00024

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METALS

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INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103391

Project No.: U8-010079

Date Collected: 05/09/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-TA-003-1

Lab Code: K2103391-006

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.6	2	5/29/01	5/30/01	5130		
Antimony	6020	0.53	50	5/29/01	5/30/01	233		N
Arsenic	6020	0.5	5	5/23/01	5/29/01	201		
Cadmium	6020	0.05	5	5/23/01	5/29/01	24.2		
Chromium	6020	0.2	5	5/23/01	5/29/01	5.2		
Copper	6020	0.1	5	5/23/01	5/29/01	133		
Iron	6010B	4.2	2	5/29/01	5/30/01	34800		
Lead	6010B	21.2	2	5/29/01	5/30/01	10300		
Selenium	6020	1.1	5	5/23/01	5/29/01	25.7		
Silver	6020	0.21	50	5/29/01	5/30/01	87.7		
Zinc	6010B	2.1	2	5/29/01	5/30/01	11600		

% Solids: 78.7

Comments:

00025

136/15/01 SW-846

METALS

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INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103391

Project No.: U8-010079

Date Collected: 05/11/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-SD-001-6

Lab Code: K2103391-007

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.6	2	5/29/01	5/30/01	4230		
Antimony	6020	0.05	5	5/29/01	5/30/01	77.0		N
Arsenic	6020	0.5	5	5/23/01	5/29/01	97.1		
Cadmium	6020	0.05	5	5/23/01	5/29/01	45.7		
Chromium	6020	0.2	5	5/23/01	5/29/01	8.0		
Copper	6020	0.1	5	5/23/01	5/29/01	117		
Iron	6010B	3.8	2	5/29/01	5/30/01	22600		
Lead	6010B	19.1	2	5/29/01	5/30/01	2470		
Selenium	6020	1.0	5	5/23/01	5/29/01	5.9		
Silver	6020	0.02	5	5/29/01	5/30/01	12.1		
Zinc	6010B	1.9	2	5/29/01	5/30/01	9550		

% Solids: 58.1

Comments:

00026

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METALS

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INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103391

Project No.: U8-010079

Date Collected: 05/11/01

Project Name: NA

Date Received: 05/14/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-SD-301-6

Lab Code: K2103391-008

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.4	2	5/29/01	5/30/01	5180		
Antimony	6020	0.05	5	5/29/01	5/30/01	69.4		N
Arsenic	6020	0.5	5	5/23/01	5/29/01	154		
Cadmium	6020	0.05	5	5/23/01	5/29/01	77.0		
Chromium	6020	0.2	5	5/23/01	5/29/01	10.5		
Copper	6020	0.1	5	5/23/01	5/29/01	185		
Iron	6010B	4.2	2	5/29/01	5/30/01	27800		
Lead	6010B	20.8	2	5/29/01	5/30/01	3340		
Selenium	6020	1.0	5	5/23/01	5/29/01	7.3		
Silver	6020	0.02	5	5/29/01	5/30/01	11.6		
Zinc	6010B	2.1	2	5/29/01	5/30/01	11200		

% Solids: 68.6

Comments:

00027

Data Validation Report:	Wet Chemistry and Trace Metals
Project:	Richardson Flats May 2001 Sampling
Project Manager:	Jeff Montera
Site:	Richardson Flats
Sample Delivery Group (SDG):	K2103271 (U8-010079)
Contract Laboratory:	Columbia Analytical Services Kelso, Washington
Reviewer:	Amy Ballow, CDM Federal
Second Reviewer:	Lisa Burnley, CDM Federal
Date Reviews Completed:	June 21, 2001
Matrix:	Soil, Water

Data validation was performed following the guidelines in the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, February 1994).

All data are considered to be valid and acceptable including those analytes that have been qualified as estimated (J). All actions are detailed in the following report.

This report includes analytical results for five soil samples and three water samples (listed below) collected at the Richardson Flats Site during May 2001 and analyzed for wet chemistry parameters and trace metals as listed above by Columbia Analytical Services, Kelso, Washington.

Water samples were analyzed for total metals (Al, Sb, As, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, K, Se, Ag, Na, Zn) and dissolved metals (Al, Sb, As, Cd, Cr, Cu, Fe, Pb, Mn, Se, Ag, Zn). Soils samples were analyzed for arsenic and lead only.

Sample Numbers:

01-E1-SW-003-0	01-E2-ON-005-2
01-E1-SW-303-0	01-E2-ON-305-2
01-E1-SW-002-0	01-E2-ON-007-2
01-E2-ON-001-2	01-E2-ON-307-2

1. Holding Time and Sample Preservation

All holding times were met.

Although the case narrative indicated the samples were received within the temperature criteria, the Cooler Receipt and Preservation Form indicated the temperature of the coolers upon receipt at the laboratory 10.9 degrees Celsius. No action is taken, as the effect of temperature on the samples is unknown.

2. Instrument Calibration and Calibration Verification

The criteria for initial calibration verification (ICV) and continuing calibration verification (CCV) were within control limits.

3. Blank Contamination

The highest concentration of an analyte detected in a blank sample is used to determine an action level for purposes of data qualification. Blank contamination and actions are discussed below.

(A) Laboratory Blanks

None of the target analytes were detected in the method blanks associated with these samples.

(B) Calibration Blanks

Calibration blank data met required criteria.

(C) Equipment Rinsate and Field Blanks

No equipment rinsate blanks or field blanks were analyzed with this job number.

4. Matrix Spike (MS) Analyses

The MS analyses were performed for all applicable analytes. The percent recoveries (%Rs) for all analytes were within the required QC limits, with the following exception. The %R of selenium was above the the QC limits of 75-125% at 130% in the MS analysis of the water sample 01-E2-SW-303-0. The post digestion spike recovery for selenium was also high at 144%. No action was required, as there were no positive results for selenium reported in the associated water samples. Action is only taken on positive results for recoveries greater than 125% .

The spike recovery for manganese in the post digest MS analysis of sample 01-E2-SW-303-0 was above the QC limits at 260%. The sample concentration for manganese was greater than four times the spike concentration. No action was required.

5. Laboratory Control Samples

The laboratory control samples were analyzed for all analytes and the results are within the required QC limits.

6. Laboratory Duplicate Sample Analyses

All calculable relative percent differences (RPDs) were less than or equal to the validation limits of 20% or within the control limit of \pm the CRDL for water samples. All RPDs were less than or equal to the validation limits of 35% or within the control limits of $\pm 2 * \text{CRDL}$ for the soil samples.

7. Field Duplicates

Field duplicate analyses were performed on sample duplicates 01-E2-SW-003-0 / 01-E2-SW-303-0, 01-E2-ON-005-2 / 01-E2-ON-305-0, and 01-E2-ON-007-2 / 01-E2-ON-307-0. Field duplicate results were within appropriate control limits.

8. Instrument Detection Limits

Instrument detection limits met the specified limits of this project.

9. Inductively Coupled Plasma Serial Dilution Analysis

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

10. System Performance and Overall Assessment

The data from the analysis of the listed samples are usable for their intended purpose.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: U.S. Environmental Protection Agency
Project: U8-010079
Sample Matrix: Water

Service Request: K2103271
Date Collected: 5/7/01
Date Received: 5/9/01

Inorganic Parameters

Sample Name: 01-E2-SW-003-0
Lab Code: K2103271-001
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
pH	pH UNITS	150.1	--	1	NA	5/9/01	7.74	
Conductivity	uMHOS/cm	120.1	2	1	NA	5/11/01	1550	
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	1	NA	5/18/01	218	
Bicarbonate as CaCO ₃	mg/L (ppm)	SM 2320B	2	1	NA	5/18/01	218	
Carbonate as CaCO ₃	mg/L (ppm)	SM 2320B	2	1	NA	5/18/01	ND	
Ammonia as Nitrogen	mg/L (ppm)	350.1	0.05	1	NA	5/18/01	ND	
Nitrate+Nitrite as Nitrogen	mg/L (ppm)	353.2	0.2	1	NA	5/16/01	ND	
Phosphorus, Total	mg/L (ppm)	365.3	0.01	1	NA	5/16/01	0.03	
Solids, Total Dissolved (TDS)	mg/L (ppm)	160.1	5	1	NA	5/11/01	1150	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	1	NA	5/11/01	ND	
Sulfate	mg/L (ppm)	300.0	20	100	NA	5/14/01	539	
Chloride	mg/L (ppm)	300.0	4.0	20	NA	5/14/01	78.1	

SM

Standard Methods for the Examination of Water and Wastewater, 19th Ed., 1995.

AB

0617-01

Approved By: 

Date: 5/24/01

1522/020597p

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: U.S. Environmental Protection Agency
Project: U8-010079
Sample Matrix: Water

Service Request: K2103271

Date Collected: 5/7/01

Date Received: 5/9/01

Inorganic Parameters

Sample Name: 01-E2-SW-303-0
Lab Code: K2103271-002
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
pH	pH UNITS	150.1	--	1	NA	5/9/01	7.77	
Conductivity	uMHOS/cm	120.1	2	1	NA	5/11/01	1560	
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	1	NA	5/18/01	216	
Bicarbonate as CaCO ₃	mg/L (ppm)	SM 2320B	2	1	NA	5/18/01	216	
Carbonate as CaCO ₃	mg/L (ppm)	SM 2320B	2	1	NA	5/18/01	ND	
Ammonia as Nitrogen	mg/L (ppm)	350.1	0.05	1	NA	5/18/01	ND	
Nitrate+Nitrite as Nitrogen	mg/L (ppm)	353.2	0.2	1	NA	5/16/01	ND	
Phosphorus, Total	mg/L (ppm)	365.3	0.01	1	NA	5/16/01	0.03	
Solids, Total Dissolved (TDS)	mg/L (ppm)	160.1	5	1	NA	5/11/01	1100	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	1	NA	5/11/01	ND	
Sulfate	mg/L (ppm)	300.0	20	100	NA	5/14/01	536	
Chloride	mg/L (ppm)	300.0	4.0	20	NA	5/14/01	82.0	

Standard Methods for the Examination of Water and Wastewater, 19th Ed., 1995.

Approved By: 

Date: 5/24/01

522/020597p

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06-17-01

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: U.S. Environmental Protection Agency
Project: U8-010079
Sample Matrix: Water

Service Request: K2103271
Date Collected: 5/7/01
Date Received: 5/9/01

Inorganic Parameters

Sample Name: 01-E2-SW-002-0
Lab Code: K2103271-003
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
pH	pH UNITS	150.1	—	1	NA	5/9/01	7.92	
Conductivity	uMHOS/cm	120.1	2	1	NA	5/11/01	1660	
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	1	NA	5/18/01	130	
Bicarbonate as CaCO ₃	mg/L (ppm)	SM 2320B	2	1	NA	5/18/01	130	
Carbonate as CaCO ₃	mg/L (ppm)	SM 2320B	2	1	NA	5/18/01	ND	
Ammonia as Nitrogen	mg/L (ppm)	350.1	0.05	1	NA	5/18/01	ND	
Nitrate+Nitrite as Nitrogen	mg/L (ppm)	353.2	0.2	1	NA	5/16/01	ND	
Phosphorus, Total	mg/L (ppm)	365.3	0.01	1	NA	5/16/01	0.03	
Solids, Total Dissolved (TDS)	mg/L (ppm)	160.1	5	1	NA	5/11/01	836	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	1	NA	5/11/01	ND	
Sulfate	mg/L (ppm)	300.0	10	50	NA	5/14/01	262	
Chloride	mg/L (ppm)	300.0	10	50	NA	5/14/01	292	

SM

Standard Methods for the Examination of Water and Wastewater, 19th Ed., 1995.

Approved By: _____

Date: _____

1522/020597p

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06-17-01

Page No.:

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: U.S. Environmental Protection Agency
Project: U8-010079
Sample Matrix: Soil

Service Request: K2103271
Date Collected: 5/7/01
Date Received: 5/9/01

pH

Prep Method: NONE
Analysis Method: 9045C
Test Notes:

Units: pH UNITS
Basis: NA

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
01-E2-ON-001-2	K2103271-004	--	1	NA	5/22/01	7.83	
01-E2-ON-005-2	K2103271-005	--	1	NA	5/22/01	7.60	
01-E2-ON-305-2	K2103271-006	--	1	NA	5/22/01	7.44	
01-E2-ON-007-2	K2103271-007	--	1	NA	5/22/01	7.73	
01-E2-ON-307-2	K2103271-008	--	1	NA	5/22/01	7.66	

AB

0617-01

Approved By: _____

Date: _____

5/24/01

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079.

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: WATER

Units: µg/L

Basis: NA

Sample Name: 01-E2-SW-003-0

Lab Code: K2103271-001

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	1	5/22/01	5/23/01	50	U	
Antimony	6020	0.05	1	5/22/01	5/25/01	2.12		
Arsenic	6020	0.5	1	5/22/01	5/25/01	4.3		
Cadmium	6020	0.05	1	5/22/01	5/25/01	0.09		
Chromium	6010B	5.0	1	5/22/01	5/23/01	5.0	U	
Copper	6020	0.1	1	5/22/01	5/25/01	1.3		
Iron	6010B	20.0	1	5/22/01	5/23/01	31.5		
Lead	6020	0.02	1	5/22/01	5/25/01	0.68		
Manganese	6020	0.05	1	5/22/01	5/25/01	378		
Selenium	6020	3.0	1	5/22/01	5/25/01	3.0	U	N
Silver	6020	0.02	1	5/22/01	5/25/01	0.02	U	
Zinc	6010B	10.0	1	5/22/01	5/23/01	198		

* Solids: 0.0

Comments:

AB
06-17-01

00134

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: WATER

Units: µg/L

Basis: NA

Sample Name: 01-E2-SW-003-0

Lab Code: K2103271-001 DIS

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	1	5/22/01	5/23/01	50	U	
Antimony	6020	0.05	1	5/22/01	5/25/01	2.16		
Arsenic	6020	0.5	1	5/22/01	5/25/01	4.2		
Cadmium	6020	0.05	1	5/22/01	5/25/01	0.05	U	
Calcium	6010B	50	1	5/22/01	5/23/01	230000		
Chromium	6010B	5.0	1	5/22/01	5/23/01	5.0	U	
Copper	6020	0.1	1	5/22/01	5/25/01	1.4		
Iron	6010B	20.0	1	5/22/01	5/23/01	20.0	U	
Lead	6020	0.02	1	5/22/01	5/25/01	0.50		
Magnesium	6010B	20.0	1	5/22/01	5/23/01	49900		
Manganese	6020	0.05	1	5/22/01	5/25/01	381		
Potassium	6010B	2000	1	5/22/01	5/23/01	2000	U	
Selenium	6020	3.0	1	5/22/01	5/25/01	3.0	U	N
Silver	6020	0.02	1	5/22/01	5/25/01	0.02	U	
Sodium	6010B	100	1	5/22/01	5/23/01	47900		
Zinc	6010B	10.0	1	5/22/01	5/23/01	127		

* Solids: 0.0

Comments:

AB
06/17/01

00135

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: WATER

Units: µg/L

Basis: NA

Sample Name: 01-E2-SW-303-0

Lab Code: K2103271-002

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	1	5/22/01	5/23/01	50	U	
Antimony	6020	0.05	1	5/22/01	5/25/01	2.14		
Arsenic	6020	0.5	1	5/22/01	5/25/01	4.3		
Cadmium	6020	0.05	1	5/22/01	5/25/01	0.10		
Chromium	6010B	5.0	1	5/22/01	5/23/01	5.0	U	
Copper	6020	0.1	1	5/22/01	5/25/01	1.4		
Iron	6010B	20.0	1	5/22/01	5/23/01	31.0		
Lead	6020	0.02	1	5/22/01	5/25/01	0.69		
Manganese	6020	0.05	1	5/22/01	5/25/01	387		
Selenium	6020	3.0	1	5/22/01	5/25/01	3.0	U	N
Silver	6020	0.02	1	5/22/01	5/25/01	0.02	U	
Zinc	6010B	10.0	1	5/22/01	5/23/01	175		

% Solids: 0.0

Comments:

AB
06-17-01

01136

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: WATER

Units: µg/L

Basis: NA

Sample Name: 01-E2-SW-303-0

Lab Code: K2103271-002 DIS

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	1	5/22/01	5/23/01	50	U	
Antimony	6020	0.05	1	5/22/01	5/25/01	2.10		
Arsenic	6020	0.5	1	5/22/01	5/25/01	4.1		
Cadmium	6020	0.05	1	5/22/01	5/25/01	0.05		
Calcium	6010B	50	1	5/22/01	5/23/01	224000		
Chromium	6010B	5.0	1	5/22/01	5/23/01	5.0	U	
Copper	6020	0.1	1	5/22/01	5/25/01	1.5		
Iron	6010B	20.0	1	5/22/01	5/23/01	20.0	U	
Lead	6020	0.02	1	5/22/01	5/25/01	0.44		
Magnesium	6010B	20.0	1	5/22/01	5/23/01	49000		
Manganese	6020	0.05	1	5/22/01	5/25/01	372		
Potassium	6010B	2000	1	5/22/01	5/23/01	2000	U	
Selenium	6020	3.0	1	5/22/01	5/25/01	3.0	U	N
Silver	6020	0.02	1	5/22/01	5/25/01	0.02	U	
Sodium	6010B	100	1	5/22/01	5/23/01	47400		
Zinc	6010B	10.0	1	5/22/01	5/23/01	128		

% Solids: 0.0

Comments:

AB
06/17/01

00137

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: WATER

Units: µg/L

Basis: NA

Sample Name: 01-E2-SW-002-0

Lab Code: K2103271-003

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	1	5/22/01	5/23/01	50	U	
Antimony	6020	0.05	1	5/22/01	5/25/01	9.11		
Arsenic	6020	0.5	1	5/22/01	5/25/01	4.5		
Cadmium	6020	0.05	1	5/22/01	5/25/01	7.02		
Chromium	6010B	5.0	1	5/22/01	5/23/01	5.0	U	
Copper	6020	0.1	1	5/22/01	5/25/01	4.8		
Iron	6010B	20.0	1	5/22/01	5/23/01	224		
Lead	6020	0.02	1	5/22/01	5/25/01	27.9		
Manganese	6020	0.05	1	5/22/01	5/25/01	192		
Selenium	6020	3.0	1	5/22/01	5/25/01	3.0	U	N
Silver	6020	0.02	1	5/22/01	5/25/01	0.12		
Zinc	6010B	10.0	1	5/22/01	5/23/01	1740		

% Solids: 0.0

Comments:

AB
06-17-01

00138

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079 --

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: WATER

Units: µg/L

Basis: NA

Sample Name: 01-E2-SW-002-0

Lab Code: K2103271-003 DIS

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	1	5/22/01	5/23/01	50	U	
Antimony	6020	0.05	1	5/22/01	5/25/01	8.45		
Arsenic	6020	0.5	1	5/22/01	5/25/01	2.8		
Cadmium	6020	0.05	1	5/22/01	5/25/01	6.00		
Calcium	6010B	50	1	5/22/01	5/23/01	145000		
Chromium	6010B	5.0	1	5/22/01	5/23/01	5.0	U	
Copper	6020	0.1	1	5/22/01	5/25/01	8.0		
Iron	6010B	20.0	1	5/22/01	5/23/01	38.0		
Lead	6020	0.02	1	5/22/01	5/25/01	3.48		
Magnesium	6010B	20.0	1	5/22/01	5/23/01	32300		
Manganese	6020	0.05	1	5/22/01	5/25/01	182		
Potassium	6010B	2000	1	5/22/01	5/23/01	2170		
Selenium	6020	3.0	1	5/22/01	5/25/01	3.0	U	N
Silver	6020	0.02	1	5/22/01	5/25/01	0.02	U	
Sodium	6010B	100	1	5/22/01	5/23/01	148000		
Zinc	6010B	10.0	1	5/22/01	5/23/01	1720		

% Solids: 0.0

Comments:

AB
06-17-01

00139

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No: U8-010079

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-001-2

Lab Code: K2103271-004

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/22/01	5/25/01	15.5		
Lead	6020	0.06	5	5/22/01	5/25/01	319		

% Solids: 81.1

Comments:

AB
06-17-0100311
SW-846

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-005-2

Lab Code: K2103271-005

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/22/01	5/25/01	5.0		
Lead	6020	0.06	5	5/22/01	5/25/01	27.9		

% Solids: 81.3

Comments:

AB
0617-01

00312

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency Service Request: K2103271
Project No.: U8-010079 Date Collected: 05/07/01
Project Name: NA Date Received: 05/09/01
Matrix: SOIL Units: MG/KG
Basis: Dry

Sample Name: 01-E2-ON-305-2

Lab Code: K2103271-006

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.6	5	5/22/01	5/25/01	4.7		
Lead	6020	0.06	5	5/22/01	5/25/01	32.3		

% Solids: 80.5

Comments:

AB
06-17-01

00313

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-007-2

Lab Code: K2103271-007

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.5	5	5/22/01	5/25/01	14.3		
Lead	6020	0.05	5	5/22/01	5/25/01	202		

% Solids: 78.2

Comments:

AB
06-17-01
00314

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: U.S. Environmental Protection Agency

Service Request: K2103271

Project No.: U8-010079

Date Collected: 05/07/01

Project Name: NA

Date Received: 05/09/01

Matrix: SOIL

Units: MG/KG

Basis: Dry

Sample Name: 01-E2-ON-307-2

Lab Code: K2103271-008

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020	0.5	5	5/22/01	5/25/01	11.4		
Lead	6020	0.05	5	5/22/01	5/25/01	144		

% Solids: 78.3

Comments:

AB
06-17-01

00315

1

Total Solids

4

$S_{OILS} = Ag \cdot Pb \text{ on } \eta \rightarrow [6020]$

109 Full

90% Cursory

Cooler Temp = 10.9 outside $4 \pm 2^\circ\text{C}$

1. If holding times are exceeded, all sample results are estimated (JY/UJ).
2. If holding times are grossly exceeded ($\geq 2 \times$ holding time), detected results are estimated (J), and non-detected results are rejected (R).

A. Preserved w/HNO3 and cooled to 4°C
B. Cooled to 4°C
C. No Preservative

Amy BALLOW

Date: 06-17-01

L. Birdley

Date:

Holding Time = Analysis Date - Collection Date

Inorg98.xls

1990

1990

• List all ICP analytes that did not meet the percent recovery criteria for initial calibration verification (ICV) and continuing calibration verification (CCV).

[illegible]

Actions:

ICV/CCV Actions:

PERCENT RECOVERY

<75%	75-89%	90-110%	111-125%	>125%
R	J	V	J	R
R	UJ	V	V	V

Detected results

Non-detected Results

1. If the instrument was not calibrated daily and each time the instrument was set up, qualify the data as rejected (R).

Inorg98.xls

تاریخ: ۱۳۸۵/۰۵/۰۵

BATCH: K2103271



Verify

One prep blank per batch

CCB analyzed after each CCV.

Field/equipment/rinsate blanks analyzed? If so, include above if applicable to project.

COMMENTS

1

1. If $\{Blank\} < IDL$, no action is taken.
 2. If $Blank \geq IDL$, then all sample results $\geq IDL$ and $< 5 * Blank$ are non-detected (U).
 3. If $Blank = < -IDL$, all sample results $\geq IDL$ and $< 5 * \{Blank\}$ are estimated (J).
 4. If $Blank = < -IDL$ then all non-detected results are estimated (UJ).
- * If blank concentration $> CRDL$, all detected sample results $< 5 * Blanks$ are rejected (R).
- * If blank concentration $> CRDL$, all detected sample results $> 5 * Blanks$ and $< 10 * Blank$ are estimated (J).

IVA. INORGANIC ANALYSIS WORKSHEET – ICP INTERFERENCE CHECK SAMPLE

BATCH: K 2103271

NOTE: The sample results can be accepted without qualification, if the sample concentrations of Al, Ca, Fe and Mg are less than or equal to the concentration found in the ICSA solution.

Examine the sample results in ug/L and list any Al, Ca, Fe or Mg results that are greater than the ICSA values.

Sample ID	Analyte	Sample Result	ICS Value	Comments
				NA - Soil for As Pb only

List any analytes in the ICS AB solution that did not meet the criteria of 80-120% R.

Analyte	% R	Action	Samples Affected
			Arsenic = 90% } Soils ✓
			NA Pb. }
			Waters = 80-120% ✓

CLP Protocol Only

Were Interference Check Samples run at the beginning and end of each sample analysis run, or a minimum of twice per 8-hour shift (whichever is more frequent)? Yes No

COMMENTS

Actions:

PERCENT RECOVERY

	<50%	50-79%	80-120%	>120%
Detected results	R	J	V	J
Non-detected results	R	UJ	V	V

BATCH:

K210327

Note: For the CLP protocol only, report the concentration of any analytes detected in the ICSEA solution > |IDL| that should not be present

(apply only to samples with elements identified at concentrations above the ICSA on the previous page).

[illegible]

Actions:

If the ICSA value > the positive IDL:

1. For non-detected results, no action is taken.
2. Estimate (J) all detected results $\leq 5 \times \text{ICSA}$.

If the ICSEA value < -IDL:

1. Estimate (J) detected results $\leq 5^{\circ}$ |ICSA|.
2. Estimate (UJ) non-detected results.

VI. INORGANIC ANALYSIS WORKSHEET - LABORATORY DUPLICATES

MATRIX: Soil / WaterBATCH: K2103271

List all parameters that do not meet RPD or CRDL criteria.

Sample ID	Analyte	Sample Result	Dup. Results	RPD	Difference ³	Action	Samples Affected
U8-010079	As	15.5	16.3	5✓		None	All w/in criteria
MS-S	Pb	319	323	1✓		↓	↓ <20% ↓ <35%
01-E2-SW-003-0 (-0040)	01-E2-ON-001-02D (-0040)						✓
01-E2-SW-303-0 (-002D)	All					None	- All <35% <20% or diff < CRDL
Field duplicates were not reported as follows							
01-E2-SW-003-0 / 01-E2-SW-303-0 - Water							
01-E2-ON-005-2 / 01-E2-ON-305-2 - Soil							
01-E2-ON-007-2 / 01-E2-ON-307-2							
Soils							
-0037	-00307			-005/05			
Fe 31.5	31.0	> 2%	w/in 20%	As = 5.0 / 4.7 = 6%	✓	OK	w/in 35%
Cu 1.5	1.4	> 7%	OK	Pb = 27.9 / 32.3 = 14.6%			
Mn 390	307	> 2%					
Ca 0.09	0.10	< 10%					
Zn = 198 / 175		= 12%	✓				
003 Da	303 Da			-007 / -307			
As = 14.3 / 11.4		= 22.5%					w/in 35%
Pb 2.02 / 1.44		= 33.5%					
Sh 2.16 / 2.0		= 3%	w/in 20%				
As = 4.2 / 4.1		= 2%	OK				
Ca = 23000 / 22400		= 3%	✓				
Mn = 4900 / 4900		= 2%					
Mg = 381 / 372		= 2%					
Na = 47400 / 47400		= 2%					
COMMENTS							

Actions:

1. AQUEOUS

If both sample values > 5*CRDL, estimate (J/UJ) all sample results of the same matrix if the RPD is > 20%.

If either sample value < 5*CRDL, and the difference between the duplicate and the original is > CRDL, estimate (J)/(UJ) all sample results of the same

2. SOLID

If both sample value > 5*CRDL, estimate (J/UJ) all sample results of the same matrix if the RPD is > 35%.

If either sample value < 5*CRDL, and the difference between the duplicate and the original is > 2*CRDL, estimate (J)/(UJ) all sample results of the

Difference = |Sample result - Duplicate sample result|

Include outliers for field duplicates (if applicable)

Note

A duplicate sample must be prepared for each sample matrix analyzed or per batch, whichever is more frequent.

BATCH: K2103271

[illegible]

LCS with the same matrix as samples must be prepared for each SDG.

Exception: Antimony and silver have no control limits. An aqueous LCS is not required for CN and mercury.

V

Y

7-12-82

Soil / Water

✓ 2103271

(over)
soils



Serial dilutions were not performed for the following:

[illegible]

Estimate (J) detected results if %D is > 10%.

If results from diluted samples are higher than concentrated sample, matrix interference should be suspected and sample results may be biased low.

X. INORGANIC ANALYSIS WORKSHEET – SAMPLE RESULT VERIFICATION

BATCH: K2103271

1. Describe any raw data anomalies (i.e., baseline shifts, negative absorbances, transcription or calculation errors, legibility, etc.)

NA

2. List results that fall outside the linear range of the ICP instrument or the calibrated range of the AA or Cyanide instrument, and were not reanalyzed.

NA

3. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? Yes No NA

No data

analyzed 5/10/01 / 5-25-01

4. Were ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes No NA

No data

No CRDL or IDL

5. Were instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 months of, and preceding, the sample analyses? Yes No NA

No CRDL or IDL's

→ MRL's provided

6. Were all sample results reported down to the IDL if running CLP protocol? Yes No NA

reported to MRL's ✓

7. Were all sample results reported down to MDL if running SW-846 methods? Yes No NA

8. Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No

COMMENTS

Soil = 1g → 100ml
Water 50ml → 50ml

ic: Soil 04 = As = $\frac{25.19 \mu\text{g}}{1\text{g}} \times \frac{0.1\text{L}}{1\text{L}} \times 1.5 = 125.95 \frac{\mu\text{g}}{\text{kg}} \times \frac{1}{1000} = 125.95 \frac{\text{mg}}{\text{kg}}$
Ph (Use 200) = $\frac{31.9 \mu\text{g}}{1\text{g}} \times \frac{0.1\text{L}}{1\text{L}} \times 1.5 = 319 \frac{\mu\text{g}}{\text{kg}} \times \frac{1}{1000} = 319 \frac{\text{mg}}{\text{kg}}$

K2103271

[illegible]

COMMENTS	pH = 40 hrs ✓	Phos ✓ 20 days	Carbonate = ✓ 14 day ✓
	Cl, SO ₄ = ✓ 20 days	N ₂ H ₂ = 20 days	Conductivity = 20 day ✓
	TSS, TDS = ✓ 20 days	Ammonia ✓ 20 days	Alkalinity = ✓ 14 day ✓

Action:

1. If holding times are exceeded, all positive results are estimated (J) and non-detects are estimated and undetected (UJ).
2. If the holding times are grossly exceeded, the reviewer may determine that all positive results are estimated (J), and non-detects should be rejected (R).

ANALYTE	METHOD	HOLDING TIME	PRESERVATIVE
<u>Chloride</u>	325.2	28 days	4 degrees C
<u>Nitrate/Nitrite</u>	353.2	28 days	4
<u>Sulfate</u>	375.2	28 days	4 degrees C
<u>Sulfide</u>	376.1	28 days	4 degrees C & pH >9 w/NaOH
<u>Alkalinity</u>	SM 2320	14 days	4 degrees C
<u>Tot. Dissolved Sol.</u>	160.1	7 days	4 degrees C
<u>Tot. Suspended Sol.</u>	160.2	7 days	4 degrees C
<u>Oil/Grease</u>	413.1	28 days	4
<u>Cyanide</u>	335.3	14 days	4 degrees C & pH >12 w/NaOH
<u>Tot. Phosphate</u>	365.2	28 days	4 degrees C & pH <2 w/H2SO4
<u>Fluoride</u>	300	28 days	4 degrees C
<u>Nitrite</u>	354.1	48 hours	4 degrees C
<u>ortho-Phosphate</u>	365.1	48 hours	4 degrees C
<u>Tot. Organic Carbon</u>	415.1	28 days	4 degrees C & pH <2 w/H2SO4
<u>Dis. Organic Carbon</u>	415.1	28 days	4 degrees C & pH <2 w/H2SO4
<u>Hardness</u>	130.1	180 days	4 degrees C & pH <2 w/H2SO4
<u>Ammonia</u>	350.1	28 days	4 degrees C & pH <2 w/H2SO4
<u>BOD/CBOD</u>	405.1	2 days	4 degrees C

Validator Amy Ballou Date 06-17-0

Reviewer L. B. Wiley Date

MATRIX: Wato

BATCH: K2103271

[illegible]

1. Was a CCV run every 10 samples? Yes No

2. Were the correct number of standards and blanks used to calibrate the instrument? Yes No

3. Is the initial calibration correlation coefficient ≥ 0.995 ?

NA 7 Phos = 1.000 ✓

If no, list affected analytes and samples

$$CI = 0.998 \checkmark$$

COMMENTS

$$S = 0.998 \checkmark$$

Note : Cooler Temp : 10.9°C - Outside $4 \pm 2^{\circ}\text{C}$

1. If any analyte does not meet the percent recovery criteria, follow the actions below.

PERCENT RECOVERY

<=50 51-84 85-115 >=116

Positive Results

$$R \quad J \quad \underbrace{V \quad J}$$

Non-detects

R UJ V V

2. If the minimum number of standards were not used for initial calibration or the instrument was not calibrated daily and each time the instrument was setup, qualify the data as Rejected (R).

3. If the correlation coefficient was less than 0.995, qualify positive results as estimated (J) and non-detects as estimated and undetected (UJ).

III WATER QUALITY PARAMETERS WORKSHEET-BLANKS

MATRIX: Water

BATCH: K2103271

List the largest positive and negative blank result \geq |MDL| below. Use separate worksheets for soil and water blanks.

ICB CCB MB	ANALYSIS	BLANK CONCENTRATION	ACTION	SAMPLES AFFECTED
MB	Cond.	ND	None ↓	No hits ✓
	Alkal.	↓		
	CaCO ₃ eq	ND, ND, ND		
	Ammonia	ND		
	NO ₂ -NO ₃	ND		
	Phos P	ND		
	TDS	↓		
	TSS	↓		
	S	↓		
	Cl	↓		
CCB's	Cl	ND ✓		
	Ammonia	ND ✓		
	Nitrate/Nitrite	ND ✓		
	S	ND ✓		
	T. Phos	ND ✓		
1. Was a blank run every 10 samples? <u>Yes</u> No				
COMMENTS				

Actions:

1. If |Blank| < MDL, no action is taken.
2. If Blank \geq MDL, then all sample results \geq MDL and $< 5 \times$ Blank are non-detected (U).
3. If Blank = < -MDL, all sample results \geq MDL and $< 5 \times$ |Blank| are estimated (J).
4. If Blank = < -MDL then all non-detected results are estimated (UJ).

BATCH: K2103291

Actions:

Positive results
Non-detects

<50%

R

R

PERCENT RECOVERY

51-79%

J

UJ

80-120%

V

V

>120%

J

V

Positive results
Non-detects

Lower

Control Limit Control Limit Upper Control Limit

J

UJ

V

V

J

V

MATRIX:

Water

BATCH:

K2103271

[illegible]

1. Was a matrix spike prepared at the required frequency of once every 20 samples or per batch?

Yes

No

2. Was a field blank used for spike analysis?

Yes

No

COMMENTS

Actions:

1. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no action is taken.
2. If any analyte does not meet the % R criteria, take the following actions.

Percent Recovery

<30%

30-74%

75-125%

>125%

Positive Results

J

J

▼

J

Non-detects

R

UJ

Y

Y

VII WATER QUALITY PARAMETERS WORKSHEET -- SAMPLE RESULT VERIFICATION

MATRIX: Water

BATCH: K2103271

1. Describe any raw data anomalies (i.e., baseline shifts, negative absorbances, legibility, etc.)

2. Describe any transcription or calculation errors.

3. Do all results fall within the calibrated range of the instrument?

Yes

No

If no, list all results outside calibrated range.

COMMENTS

Tabbed Page: Appendix B

Appendix B

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM						RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL			
RF-BG-3: RF-BG-BG3-05102001														
AS TOTAL (mg/Kg)	01-E2-RF-003-2	6020	6.4			0.6	RF-BG-BG3	6010			5	29.33%		
H+ (mol/L)	01-E2-RF-003-2	9045C	1.51E-07			1.0E-14								
PB TOTAL (mg/Kg)	01-E2-RF-003-2	6020				0.06	RF-BG-BG3	6010	22		5	10.75%		
TOTAL SOLIDS (PERCENT)	01-E2-RF-003-2	160.3M	84.9											

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

CDM Federal Programs Corporation

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM						RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL			
RF-BG-4: RF-BG-BG4_05102001														
AS TOTAL (mg/Kg)	01-E2-RF-004-2	6020	4.4			0.6	RF-BG-BG4	6010			5	70.59%		
H+ (mol/L)	01-E2-RF-004-2	9045C	8.32E-08			1.0E-14	-	-	-	-	-	-	-	
PB TOTAL (mg/Kg)	01-E2-RF-004-2	6020				0.06	RF-BG-BG4	6010	25		5	5.45%		
TOTAL SOLIDS (PERCENT)	01-E2-RF-004-2	160.3M	83.8				-	-	-	-	-	-	-	

All samples with Usability column left blank have been determined acceptable.
Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
Shaded results are the higher of the two results.
pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log(H^+)$.
RL - Reporting Limit.
Val Qual - Validator qualifier(s).
Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
mg/Kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
S - Soil.
W - Water.
RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM					Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	
T1B: RF-OF-T1B 1-6	01-E2-OF-002-4	6020	5.6			0.6	RF-OF-T1B 1-6	6010			5	
AS TOTAL (mg/Kg)	01-E2-OF-002-4	9045C	5.75E-08			1.0E-14						
H+ (mol/L)	01-E2-OF-002-4	6020	69			0.06	RF-OF-T1B 1-6	6010			5	
PB TOTAL (mg/Kg)	01-E2-OF-002-4	180.3M	89.6									
TOTAL SOLIDS (PERCENT)												

All samples with Usability column left blank have been determined acceptable.
Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
Shaded results are the higher of the two results.
pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
RL - Reporting Limit.
Val Qual - Validator qualifier(s).
Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
mg/Kg - Milligrams per kilogram
mg/L - Milligrams per liter.
S - Soil.
W - Water.
RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem		
T1C: RF-OF-T1C 1-6" 05102001												
AG TOTAL (mg/Kg)	01-E2-OF-003-6	6020	0.34			0.02	RF-OF-T1C 1-6"	6010		U	5	NC
AS TOTAL (mg/Kg)	01-E2-OF-003-6	6020	4			0.6	RF-OF-T1C 1-6"	6010			5	76.92%
CD TOTAL (mg/Kg)	01-E2-OF-003-6	6020	0.4			0.06	RF-OF-T1C 1-6"	6010			.50	85.71%
CR TOTAL (mg/Kg)	01-E2-OF-003-6	6020	19.9			0.2	RF-OF-T1C 1-6"	6010			5	5.38%
CU TOTAL (mg/Kg)	01-E2-OF-003-6	6020	18			0.1	RF-OF-T1C 1-6"	6010			5	32.56%
H+ (mol/L)	01-E2-OF-003-6	9045C	2.82E-08			1.0E-14	-	-		-	-	-
PB TOTAL (mg/Kg)	01-E2-OF-003-6	6020	30.8			0.06	RF-OF-T1C 1-6"	6010			5	99.67% Unacceptable - RPD
SB TOTAL (mg/Kg)	01-E2-OF-003-6	6020	0.45	N	J	0.06	-	-		-	-	-
SE TOTAL (mg/Kg)	01-E2-OF-003-6	6020	1.1	U		1.1	RF-OF-T1C 1-6"	6010		U	5	NC
TOTAL SOLIDS (PERCENT)	01-E2-OF-003-6	160.3M	88.7				-	-		-	-	-
ZN TOTAL (mg/Kg)	01-E2-OF-003-6	6020	79.3		J	0.6	RF-OF-T1C 1-6"	6010			5	70.16% Unacceptable - RPD

All samples with Usability column left blank have been determined acceptable.

Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.

Shaded results are the higher of the two results.

pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.

RL - Reporting Limit.

Val Qual - Validator qualifier(s).

Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.

mg/Kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

S - Soil.

W - Water.

RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM					
	Sample ID	Method	Result	Lab Rem	Val	RL	Sample ID	Method	Result	Lab Rem	RL	RPD
T1D: RF-QF-T1D-0-2' 05102001												
AS TOTAL (mg/Kg)	01-E2-QF-004-2	6020	5.7			0.6	RF-QF-T1D-0-2'	6010			5	32.97%
H+ (mM/L)	01-E2-QF-004-2	9045C	3.02E-07			1.0E-14						
PB TOTAL (mg/Kg)	01-E2-QF-004-2	6020	82.3			0.06	RF-QF-T1D-0-2'	6010			5	5.55%
TOTAL SOLIDS (PERCENT)	01-E2-QF-004-2	160.3M	84									

All samples with Usability column left blank have been determined acceptable.
Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
Shaded results are the higher of the two results.
pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
RL - Reporting Limit.
Val Qual - Validator qualifier(s).
Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
mg/Kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
S - Soil.
W - Water.
RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM						Usability
	Sample ID	Method	Result	Lab	Val	RL	Sample ID	Method	Result	Lab	RL		
				Rem	Qual					Rem			
T1F: RF-OF-T1F 0-2' (mg/Kg)	01-E2-OF-006-2	6020	5.7			0.6	RF-OF-T1F 0-2'	6010			5	63.47%	
AS TOTAL (mg/Kg)	01-E2-OF-006-2	9045C	8.71E-08			1.0E-14							
H+ (mol/L)	01-E2-OF-006-2	6020	28.9			0.06	RF-OF-T1F 0-2'	6010			5	92.86%	Unacceptable - RPD
PB TOTAL (mg/Kg)	01-E2-OF-006-2												
TOTAL SOLIDS (PERCENT)	01-E2-OF-006-2	160.3M	88.7										

NC - Not Calculated because one or both concentrations are non detects.
mg/Kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
S - Soil.
W - Water.
RPD - Relative Percent Difference.

All samples with Usability column left blank have been determined acceptable.
Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
Shaded results are the higher of the two results.
pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $\text{pH} = -\log[\text{H}^+]$.
RL - Reporting Limit.
Val Qual - Validator qualifier(s).
Lab Rem - Lab qualifier(s).

CDM Federal Programs Corporation

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Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM					RPD	Usability
	Sample ID	Method	Result	Lab	Val	RL	Sample ID	Method	Result	Lab	RL		
				Rem	Qual					Rem			
T2A: RF-OF-T2A 0-2' 05092001													
AS TOTAL (mg/kg)	01-E2-OF-009-6	6020	11.3			0.6	RF-OF-T2A 0-2'	6010			5	118.28%	Unacceptable - RPD
H+ (mol/L)	01-E2-OF-009-6	9045C	9.77E-09			1.0E-14							
PB TOTAL (mg/kg)	01-E2-OF-009-6	6020	136			0.06	RF-OF-T2A 0-2'	6010			5	120.62%	Unacceptable - RPD
TOTAL SOLIDS (PERCENT)	01-E2-OF-009-6	160.3M	83										

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detect.
 mg/kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem		
T2C: RF-OF-T2C 0-2" 05082001												
AS TOTAL (mg/kg)	01-E2-OF-011-2	6020	76.3			0.5	RF-OF-T2C 0-2"	6010			5	Unacceptable - RPD
H+ (mol/L)	01-E2-OF-011-2	9045C	1.78E-08			1.0E-14						
PB TOTAL (mg/kg)	01-E2-OF-011-2	6020	2140			1.1	RF-OF-T2C 0-2"	6010			5	Unacceptable - RPD
TOTAL SOLIDS (PERCENT)	01-E2-OF-011-2	160.3M	76									

All samples with Usability column left blank have been determined acceptable.
Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
Shaded results are the higher of the two results.
pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log(H^+)$.
RL - Reporting Limit.
Val Qual - Validator qualifier(s).
Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
mg/Kg - Milligrams per Kilogram.
mg/L - Milligrams per liter.
S - Soil.
W - Water.
RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM						Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	RPD	
T2H: RF-OF-T2H 0-2" 05092001													
AG TOTAL (mg/Kg)	01-E2-OF-016-2	6020	0.54			0.02	RF-OF-T2H 0-2"	6010		U	5	NC	
AS TOTAL (mg/Kg)	01-E2-OF-016-2	6020	6.1			0.6	RF-OF-T2H 0-2"	6010			5	38.41%	
CD TOTAL (mg/Kg)	01-E2-OF-016-2	6020	0.62			0.06	RF-OF-T2H 0-2"	6010			.50	46.91%	
CR TOTAL (mg/Kg)	01-E2-OF-016-2	6020	17.7			0.2	RF-OF-T2H 0-2"	6010			5	54.62%	Unacceptable - RPD
CU TOTAL (mg/Kg)	01-E2-OF-016-2	6020	20.9			0.1	RF-OF-T2H 0-2"	6010			5	21.75%	
H+ (mol/L)	01-E2-OF-016-2	9045C	2.19E-07			1.0E-14	-	-	-	-	-	-	
PB TOTAL (mg/Kg)	01-E2-OF-016-2	6020				0.06	RF-OF-T2H 0-2"	6010	62		5	1.28%	
SB TOTAL (mg/Kg)	01-E2-OF-016-2	6020	0.89	N	J	0.06	-	-	-	-	-	-	
SE TOTAL (mg/Kg)	01-E2-OF-016-2	6020	1.2	U		1.2	RF-OF-T2H 0-2"	6010		U	5	NC	
TOTAL SOLIDS (PERCENT)	01-E2-OF-016-2	160.3M	82.5				-	-	-	-	-	-	
ZN TOTAL (mg/Kg)	01-E2-OF-016-2	6020	84.1		J	0.6	RF-OF-T2H 0-2"	6010			5	23.97%	

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detect.
 mg/Kg - Milligrams per kilogram.
 mol/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM					
	Sample ID	Method	Result	Lab Rem	Val	RL	Sample ID	Method	Result	Lab Rem	RL	RPD
T2H: RF-OF-T2H 1-6" 05092001												
AG TOTAL (mg/Kg)	01-E2-OF-016-6	6020	0.47			0.02	RF-OF-T2H 1-6"	6010		U	5	NC
AS TOTAL (mg/Kg)	01-E2-OF-016-6	6020	5.5			0.6	RF-OF-T2H 1-6"	6010			5	24.00%
CO TOTAL (mg/Kg)	01-E2-OF-016-6	6020				0.06	RF-OF-T2H 1-6"	6010	0.5	U	.50	NC
CR TOTAL (mg/Kg)	01-E2-OF-016-6	6020	22.3			0.2	RF-OF-T2H 1-6"	6010			5	29.45%
CU TOTAL (mg/Kg)	01-E2-OF-016-6	6020				0.1	RF-OF-T2H 1-6"	6010	22		5	3.57%
H+ (mol/L)	01-E2-OF-016-6	9045C	1.45E-07			1.0E-14						
PB TOTAL (mg/Kg)	01-E2-OF-016-6	6020				0.06	RF-OF-T2H 1-6"	6010	34		5	54.55%
SB TOTAL (mg/Kg)	01-E2-OF-016-6	6020	0.63	N	J	0.06						
SE TOTAL (mg/Kg)	01-E2-OF-016-6	6020	1.2	U		1.2	RF-OF-T2H 1-6"	6010		U	5	NC
TOTAL SOLIDS (PERCENT)	01-E2-OF-016-6	160.3M	81.6									
ZN TOTAL (mg/Kg)	01-E2-OF-016-6	6020			J	0.6	RF-OF-T2H 1-6"	6010	79		5	14.55%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detect.
 mg/Kg - Milligrams per Kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	
T3A: RF-OF-T3A 0-2" 05082001												
AS TOTAL (mg/Kg)	01-E2-OF-019-2	6020	6.3			0.6	RF-OF-T3A 0-2"	6010			5	33.11%
It+ (md/L)	01-E2-OF-019-2	9045C	1.74E-07			1.0E-14	-	-	-	-	-	-
PB TOTAL (mg/Kg)	01-E2-OF-019-2	6020				0.08	RF-OF-T3A 0-2"	6010	58		5	0.52%
TOTAL SOLIDS (PERCENT)	01-E2-OF-019-2	160.3M	88.7				-	-	-	-	-	-

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in md/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 md/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM						UPCM					Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	
T3B: RF-OF-T3B 1-6 (mg/Kg)	01-E2-OF-020-6	6020	1.98			0.02	RF-OF-T3B 1-6*	6010		U	5	NC
AS TOTAL (mg/Kg)	01-E2-OF-020-6	6020	19.3			0.5	RF-OF-T3B 1-6*	6010			5	33.26%
CD TOTAL (mg/Kg)	01-E2-OF-020-6	6020	14			0.05	RF-OF-T3B 1-6*	6010			50	13.33%
CR TOTAL (mg/Kg)	01-E2-OF-020-6	6020	15.6			0.2	RF-OF-T3B 1-6*	6010			5	18.58%
CU TOTAL (mg/Kg)	01-E2-OF-020-6	6020	48.5			0.1	RF-OF-T3B 1-6*	6010			5	32.03%
H+ (mol/L)	01-E2-OF-020-6	9045C	3.09E-07			1.0E-14						
PB TOTAL (mg/Kg)	01-E2-OF-020-6	6020	360			0.05	RF-OF-T3B 1-6*	6010			5	42.62%
SB TOTAL (mg/Kg)	01-E2-OF-020-6	6020	9.25	N	J	0.05						
SE TOTAL (mg/Kg)	01-E2-OF-020-6	6020	1.1	U		1.1	RF-OF-T3B 1-6*	6010		U	5	NC
TOTAL SOLIDS (PERCENT)	01-E2-OF-020-6	160.3M	75.9									
ZN TOTAL (mg/Kg)	01-E2-OF-020-6	6020	775		J	2.7	RF-OF-T3B 1-6*	6010			5	18.50%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability	
	Sample ID	Method	Result	Lab	Val	RL	Sample ID	Method	Result	Lab			RL
				Rem	Qual					Rem			
T3D: RF-OF-T3D 0-2" 05092001													
AG TOTAL (mg/Kg)	01-E2-OF-022-2	6020	0.52			0.02	RF-OF-T3D 0-2"	6010		U	5	NC	
AS TOTAL (mg/Kg)	01-E2-OF-022-2	6020	4.2			0.6	RF-OF-T3D 0-2"	6010			5	62.30%	
CD TOTAL (mg/Kg)	01-E2-OF-022-2	6020	0.66			0.06	RF-OF-T3D 0-2"	6010			.50	40.96%	
CR TOTAL (mg/Kg)	01-E2-OF-022-2	6020	17.6			0.2	RF-OF-T3D 0-2"	6010			5	12.77%	
CU TOTAL (mg/Kg)	01-E2-OF-022-2	6020	25.8			0.1	RF-OF-T3D 0-2"	6010			5	30.26%	
H+ (mol/L)	01-E2-OF-022-2	9045C	1E-08			1.0E-14	-	-	-	-	-	-	
PB TOTAL (mg/Kg)	01-E2-OF-022-2	6020	32.2			0.06	RF-OF-T3D 0-2"	6010			5	77.57% Unacceptable - RPD	
SB TOTAL (mg/Kg)	01-E2-OF-022-2	6020	1.05	N	J	0.06	-	-	-	-	-	-	
SE TOTAL (mg/Kg)	01-E2-OF-022-2	6020	1.2	U		1.2	RF-OF-T3D 0-2"	6010		U	5	NC	
TOTAL SOLIDS (PERCENT)	01-E2-OF-022-2	160.3M	70.8				-	-	-	-	-	-	
ZN TOTAL (mg/Kg)	01-E2-OF-022-2	6020	98.3		J	0.6	RF-OF-T3D 0-2"	6010			5	50.66% Unacceptable - RPD	

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM						UPCM					Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	
T3F: RF-OF-T3F 1-6" 05022001												
AS TOTAL (mg/Kg)	01-E2-OF-024-6	6020	3.1			0.6	RF-OF-T3F 1-6"	6010			5	78.43%
H+ (mol/L)	01-E2-OF-024-6	9045C	1.55E-07			1.0E-14						
PB TOTAL (mg/Kg)	01-E2-OF-024-6	6020	17.2			0.06	RF-OF-T3F 1-6"	6010			5	4.55%
TOTAL SOLIDS (PERCENT)	01-E2-OF-024-6	160.3M	82									

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detect.
 mg/Kg - Milligrams per kilogram.
 mol/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM						Usability
	Sample ID	Method	Result	Lab	Val	RL	Sample ID	Method	Result	Lab	RL		
				Rem	Qual					Rem			
1E: RF-ON-1E 0-2" 05092001													
AS TOTAL (mg/Kg)	01-E2-ON-021-2	6020	9.8			0.8	RF-ON-1E 0-2"	6010			5	68.46%	
H+ (mol/L)	01-E2-ON-021-2	9045C	1.7E-08			1.0E-14	-	-	-	-	-	-	-
PB TOTAL (mg/Kg)	01-E2-ON-021-2	6020	148			0.08	RF-ON-1E 0-2"	6010			5	77.69%	Unacceptable - RPD
TOTAL SOLIDS (PERCENT)	01-E2-ON-021-2	180.3M	85.3				-	-	-	-	-	-	-

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit
 Val Qual - Validator qualifier(s)
 Lab Rem - Lab qualifier(s)

NC - Not Calculated because one or both concentrations are non detected.
 mg/Kg - Milligrams per Kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab	Val	RL	Sample ID	Method	Result	Lab	RL	
2H: RF-ON-2H 0-2" 05082001												
AG TOTAL (mg/kg)	01-E2-ON-006-2	6020	0.21			0.02	RF-ON-2H 0-2"	6010		U	5	NC
AS TOTAL (mg/kg)	01-E2-ON-006-2	6020	1.6			0.6	RF-ON-2H 0-2"	6010		U	5	NC
CD TOTAL (mg/kg)	01-E2-ON-006-2	6020	0.19			0.06	RF-ON-2H 0-2"	6010		U	.50	NC
CR TOTAL (mg/kg)	01-E2-ON-006-2	6020	13.3			0.2	RF-ON-2H 0-2"	6010			5	53.44%
CU TOTAL (mg/kg)	01-E2-ON-006-2	6020	9.9			0.1	RF-ON-2H 0-2"	6010			5	34.31%
H+ (mol/L)	01-E2-ON-006-2	8045C	5.25E-09			1.0E-14						
PB TOTAL (mg/kg)	01-E2-ON-006-2	6020	14.8			0.06	RF-ON-2H 0-2"	6010			5	13.84%
SB TOTAL (mg/kg)	01-E2-ON-006-2	6020	0.37	N	U	0.06						
SE TOTAL (mg/kg)	01-E2-ON-006-2	6020	1.2	U		1.2	RF-ON-2H 0-2"	6010		U	5	NC
TOTAL SOLIDS (PERCENT)	01-E2-ON-006-2	160.3M	85.2									
ZN TOTAL (mg/kg)	01-E2-ON-006-2	6020	38.5		J	0.6	RF-ON-2H 0-2"	6010			5	49.76%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detectable.
 mg/kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	
3D: RF-ON-3D 0-2" 05092001												
AG TOTAL (mg/Kg)	01-E2-ON-025-2	6020	0.21			0.02	RF-ON-3D 0-2"	6010		U	5	NC
AS TOTAL (mg/Kg)	01-E2-ON-025-2	6020	3.1			0.6	RF-ON-3D 0-2"	6010			5	174.75% Unacceptable - RPD
CD TOTAL (mg/Kg)	01-E2-ON-025-2	6020	0.39			0.06	RF-ON-3D 0-2"	6010			.50	153.98% Unacceptable - RPD
CR TOTAL (mg/Kg)	01-E2-ON-025-2	6020	16.2			0.2	RF-ON-3D 0-2"	6010			5	38.81%
CU TOTAL (mg/Kg)	01-E2-ON-025-2	6020	21.3			0.1	RF-ON-3D 0-2"	6010			5	116.72% Unacceptable - RPD
H+ (mol/L)	01-E2-ON-025-2	9045C	4.9E-06			1.0E-14	-	-		-	-	-
PB TOTAL (mg/Kg)	01-E2-ON-025-2	6020	16.4			0.06	RF-ON-3D 0-2"	6010			5	187.66% Unacceptable - RPD
SB TOTAL (mg/Kg)	01-E2-ON-025-2	6020	0.24	N	UU	0.06	-	-		-	-	NC
SE TOTAL (mg/Kg)	01-E2-ON-025-2	6020	1.2	U		1.2	RF-ON-3D 0-2"	6010		U	5	NC
TOTAL SOLIDS (PERCENT)	01-E2-ON-025-2	160.3M	82.9				-	-		-	-	-
ZN TOTAL (mg/Kg)	01-E2-ON-025-2	6020	62.4		J	0.6	RF-ON-3D 0-2"	6010			5	165.01% Unacceptable - RPD

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $\text{pH} = -\log([\text{H}^+])$.
 RL - Reporting Limit
 Val Qual - Validator qualifier(s)
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 mol/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	
3E: RF-ON-3E 15-17* 05102001												
AG TOTAL (mg/kg)	01-E2-ON-019-18	6020	0.31			0.02	RF-ON-3E 15-17	6010		U	5	NC
AL TOTAL (mg/kg)	01-E2-ON-019-18	6010B	15100			12.2	RF-ON-3E 15-17	6010			5	36.31%
AS TOTAL (mg/kg)	01-E2-ON-019-18	6020	4			0.6	RF-ON-3E 15-17	6010			5	54.55%
CD TOTAL (mg/kg)	01-E2-ON-019-18	6020	0.45			0.06	RF-ON-3E 15-17	6010		U	50	NC
CR TOTAL (mg/kg)	01-E2-ON-019-18	6020	13.3			0.2	RF-ON-3E 15-17	6010			5	57.37%
CU TOTAL (mg/kg)	01-E2-ON-019-18	6020	15.8			0.1	RF-ON-3E 15-17	6010			5	45.10%
FE TOTAL (mg/kg)	01-E2-ON-019-18	6010B	17100			4.9	RF-ON-3E 15-17	6010			5	37.91%
H+ (mol/L)	01-E2-ON-019-18	9045C	3.89E-08			1.0E-14						
PB TOTAL (mg/kg)	01-E2-ON-019-18	6020				0.08	RF-ON-3E 15-17	6010	33		5	6.17%
SB TOTAL (mg/kg)	01-E2-ON-019-18	6020	0.46	N	U	0.06	RF-ON-3E 15-17	6010		U	5	NC
SE TOTAL (mg/kg)	01-E2-ON-019-18	6020	1.2	U		1.2	RF-ON-3E 15-17	6010		U	5	NC
TOTAL SOLIDS (PERCENT)	01-E2-ON-019-18	160.3M	81.7									
ZN TOTAL (mg/kg)	01-E2-ON-019-18	6020	72.1		J	0.8	RF-ON-3E 15-17	6010			5	18.73%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $\text{pH} = -\log(\text{H}^+)$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/kg - Milligrams per kilogram
 mol/L - Milligrams per liter.
 S - Soil
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem		
3G: RF-ON-3G 0-2" 05062001												
AS TOTAL (mg/kg)	01-EZ-ON-009-2	6020	10.8			0.5	RF-ON-3G 0-2"	6010			5	10.53%
H+ (mol/L)	01-EZ-ON-009-2	9045C	1.58E-07			1.0E-14						
PB TOTAL (mg/kg)	01-EZ-ON-009-2	6020				0.05	RF-ON-3G 0-2"	6010	23		5	4.26%
TOTAL SOLIDS (PERCENT)	01-EZ-ON-009-2	160.3M	93.9									

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/kg - Milligrams per Kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM						UPCM						Usability
	Sample ID	Method	Result	Lab	Val	RL	Sample ID	Method	Result	Lab	RL	RPD	
				Rem	Qual					Rem			
3H: RF-ON-3H 0-2" 05072001													
AS TOTAL (mg/kg)	01-E2-ON-005-2	6020	5			0.6	RF-ON-3H 0-2"	6010			5	40.00%	
H+ (mol/L)	01-E2-ON-005-2	9045C	2.51E-08			1.0E-14							
PB TOTAL (mg/kg)	01-E2-ON-005-2	6020				0.06	RF-ON-3H 0-2"	6010	25		5	10.96%	
TOTAL SOLIDS (PERCENT)	01-E2-ON-005-2	160.3M	81.3										

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (*In mol/L*) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	
4G: RF-ON-4G 0-2" 05082001												
AS TOTAL (mg/Kg)	01-E2-ON-008-2	6020	2.8			0.5	RF-ON-4G 0-2"	6010			5	79.57%
H+ (mol/L)	01-E2-ON-008-2	9045C	2E-08			1.0E-14						
PB TOTAL (mg/Kg)	01-E2-ON-008-2	6020	19			0.05	RF-ON-4G 0-2"	6010			5	5.13%
TOTAL SOLIDS (PERCENT)	01-E2-ON-008-2	160.3M	76.8									

All samples with Usability column left blank have been determined acceptable.
Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
Shaded results are the higher of the two results.
pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
RL - Reporting Limit.
Val Qual - Validator qualifier(s).
Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
mg/Kg - Milligrams per kilogram.
mol/L - Milligrams per liter.
S - Soil.
W - Water.
RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem Qual	RL	Sample ID	Method	Result	Lab Rem	RL		
4G: RF-ON-4G 5-7* 05082001												
AG TOTAL (mg/kg)	01-E2-ON-008-7	6020	0.3		0.02	RF-ON-4G 5-7	6010		U	5	NC	
AL TOTAL (mg/kg)	01-E2-ON-008-7	6010B	21600		11	RF-ON-4G 5-7	6010			5	18.87%	
AS TOTAL (mg/kg)	01-E2-ON-008-7	6020	2.6		0.5	RF-ON-4G 5-7	6010			5	101.89%	
CD TOTAL (mg/kg)	01-E2-ON-008-7	6020			0.05	RF-ON-4G 5-7	6010	0.5	U	.50	NC	
CR TOTAL (mg/kg)	01-E2-ON-008-7	6020	15.1		0.2	RF-ON-4G 5-7	6010			5	27.92%	
CU TOTAL (mg/kg)	01-E2-ON-008-7	6020	24.4		0.1	RF-ON-4G 5-7	6010			5	43.59%	
FE TOTAL (mg/kg)	01-E2-ON-008-7	6010B	20300		4.4	RF-ON-4G 5-7	6010			5	25.75%	
H+ (mol/L)	01-E2-ON-008-7	9045C	3.72E-08		1.0E-14							
PB TOTAL (mg/kg)	01-E2-ON-008-7	6020	17.6		0.05	RF-ON-4G 5-7	6010			5	48.93%	
SB TOTAL (mg/kg)	01-E2-ON-008-7	6020	0.31	N	0.05	RF-ON-4G 5-7	6010		U	5	NC	
SE TOTAL (mg/kg)	01-E2-ON-008-7	6020	1.1	U	1.1	RF-ON-4G 5-7	6010		U	5	NC	
TOTAL SOLIDS (PERCENT)	01-E2-ON-008-7	160.3M	76									
ZN TOTAL (mg/kg)	01-E2-ON-008-7	6020	64	J	0.5	RF-ON-4G 5-7	6010			5	43.90%	

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM						Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	RPD	
4i: RF-ON-410-2" 05082001													
AS TOTAL (mg/Kg)	01-E2-ON-001-2	6020	15.5			0.6	RF-ON-410-2"	6010			5	9.23%	
H+ (mol/L)	01-E2-ON-001-2	9045C	1.48E-08			1.0E-14							
PB TOTAL (mg/Kg)	01-E2-ON-001-2	6020	319			0.06	RF-ON-410-2"	6010			5	7.54%	
TOTAL SOLIDS (PERCENT)	01-E2-ON-001-2	160.3M	81.1										

All samples with Usability column left blank have been determined acceptable.

Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.

Shaded results are the higher of the two results.

pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $\text{pH} = -\log(\text{H}^+)$.

RL - Reporting Limit.

Val Qual - Validator qualifier(s).

Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.

mg/Kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

S - Soil.

W - Water.

RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem		
5G: RF-ON-5G 0-2" 05082001												
AS TOTAL (mg/Kg)	01-EZ-ON-007-2	6020	14.3			0.5	RF-ON-5G 0-2"	6010			5	33.24%
H+ (mol/L)	01-EZ-ON-007-2	9045C	1.88E-08			1.0E-14						
PB TOTAL (mg/Kg)	01-EZ-ON-007-2	6020	202			0.05	RF-ON-5G 0-2"	6010			5	48.97%
TOTAL SOLIDS (PERCENT)	01-EZ-ON-007-2	160.3M	78.2									

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per Kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM				UPCM					RPD	Usability	
	Sample ID	Method	Result	Lab Rem Qual	RL	Sample ID	Method	Result	Lab Rem			RL
SD-1: RF-SD-SD1 0-6" 05/12/2001												
AG TOTAL (mg/Kg)	01-E2-SD-001-6	6020	12.1			0.02	RF-SD-SD1 0-6"	6010			5	69.54%
AL TOTAL (mg/Kg)	01-E2-SD-001-6	6010B	4230			9.6	RF-SD-SD1 0-6"	6010			5	13.66%
AS TOTAL (mg/Kg)	01-E2-SD-001-6	6020	97.1			0.5	RF-SD-SD1 0-6"	6010			5	46.54%
CD TOTAL (mg/Kg)	01-E2-SD-001-6	6020	45.7			0.05	RF-SD-SD1 0-6"	6010			50	46.00%
CR TOTAL (mg/Kg)	01-E2-SD-001-6	6020	8			0.2	RF-SD-SD1 0-6"	6010			5	76.92%
CU TOTAL (mg/Kg)	01-E2-SD-001-6	6020	117			0.1	RF-SD-SD1 0-6"	6010			5	82.12%
FE TOTAL (mg/Kg)	01-E2-SD-001-6	6010B	22600			3.8	RF-SD-SD1 0-6"	6010			5	55.36%
H+ (mol/L)	01-E2-SD-001-6	9045C	2.95E-08			1.0E-14						
PB TOTAL (mg/Kg)	01-E2-SD-001-6	6010B	2470			19.1	RF-SD-SD1 0-6"	6010			5	34.23%
SB TOTAL (mg/Kg)	01-E2-SD-001-6	6020		N	J	0.05	RF-SD-SD1 0-6"	6010	72		5	6.71%
SE TOTAL (mg/Kg)	01-E2-SD-001-6	6020	5.9			1	RF-SD-SD1 0-6"	6010			5	30.22%
TOTAL SOLIDS (PERCENT)	01-E2-SD-001-6	160.3M	58.1									
ZN TOTAL (mg/Kg)	01-E2-SD-001-6	6010B	9550			1.9	RF-SD-SD1 0-6"	6010			5	22.74%

All samples with Usability column left blank have been determined acceptable.

Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.

Shaded results are the higher of the two results.

pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.

RL - Reporting Limit.

Val Qual - Validator qualifier(s).

Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
mg/Kg - Milligrams per kilogram.
mg/L - Milligrams per liter.

S - Soil.

W - Water.

RPD - Relative Percent Difference.

CDM Federal Programs Corporation

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Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab	Val	RL	Sample ID	Method	Result	Lab		
				Rem	Qual					Rem		
RF-6-2: RF-SW-RF6-2_05072001												
AG DISSOLVED (mg/L)	01-E2-SW-003-0	6020	0.00002	U		0.00002	RF-SW-RF6-2	6010		U	.005	NC
AG TOTAL (mg/L)	01-E2-SW-003-0	6020	0.00002	U		0.00002	RF-SW-RF6-2	6010		U	.005	NC
AL DISSOLVED (mg/L)	01-E2-SW-003-0	6010B	0.05	U		0.05	RF-SW-RF6-2	6020	0.05	U	.05	NC
AL TOTAL (mg/L)	01-E2-SW-003-0	6010B	0.05	U		0.05	RF-SW-RF6-2	6010	0.05	U	.05	NC
ALKALINITY (mg/L as CaCO3)	01-E2-SW-003-0	310.1	218			2	RF-SW-RF6-2	310.1			1	0.91%
AMMONIA (mg/L as N)	01-E2-SW-003-0	350.1	0.05	U		0.05	-	-	-	-	-	NC
ANION SUM (meq/L)	01-E2-SW-003-0	SM 1030F1	17.7			-	-	-	-	-	-	-
AS DISSOLVED (mg/L)	01-E2-SW-003-0	6020	0.0042			0.0005	RF-SW-RF6-2	6020		U	.005	NC
AS TOTAL (mg/L)	01-E2-SW-003-0	6020	0.0043			0.0005	RF-SW-RF6-2	6020			.005	70.68%
CA DISSOLVED (mg/L)	01-E2-SW-003-0	6010B	230			0.05	-	-	-	-	-	-
CATION SUM (meq/L)	01-E2-SW-003-0	SM 1030F1	18			-	-	-	-	-	-	-
CD DISSOLVED (mg/L)	01-E2-SW-003-0	6020	0.00005	U		0.00005	RF-SW-RF6-2	6020		U	.001	NC
CD TOTAL (mg/L)	01-E2-SW-003-0	6020	0.00009			0.00005	RF-SW-RF6-2	6020		U	.001	NC
CHLORIDE (mg/L)	01-E2-SW-003-0	300.0	78.1			4.0	RF-SW-RF6-2	325.2			1	14.16%
CO3 (mg/L as CaCO3)	01-E2-SW-003-0	SM 2320B		U		2	RF-SW-RF6-2	310.1	1	U	1	NC
CONDUCTIVITY (uMHOS/cm)	01-E2-SW-003-0	120.1				2	RF-SW-RF6-2	120.1	1508		10	2.75%
CR DISSOLVED (mg/L)	01-E2-SW-003-0	6010B	0.005	U		0.005	RF-SW-RF6-2	6010		U	.01	NC
CR TOTAL (mg/L)	01-E2-SW-003-0	6010B	0.005	U		0.005	RF-SW-RF6-2	6010		U	.01	NC
CU DISSOLVED (mg/L)	01-E2-SW-003-0	6020	0.0014			0.0001	RF-SW-RF6-2	6020			.005	Unacceptable - 5x RL
CU TOTAL (mg/L)	01-E2-SW-003-0	6020	0.0013			0.0001	RF-SW-RF6-2	6020			.005	Unacceptable - 5x RL
FE DISSOLVED (mg/L)	01-E2-SW-003-0	6010B	0.02	U		0.02	RF-SW-RF6-2	6010		U	.1	NC
FE TOTAL (mg/L)	01-E2-SW-003-0	6010B	0.0315			0.02	RF-SW-RF6-2	6010		U	.1	NC
H+ (mol/L)	01-E2-SW-003-0	150.1				1.0E-14	RF-SW-RF6-2	150.1	6.31E-09		1.0E-14	Unacceptable - RPD
HARDNESS (mg/L as CaCO3)	01-E2-SW-003-0	6010B/SM 2320B	729			0.2	RF-SW-RF6-2	2340B	729		0.2	7.91%
HCO3 (mg/L as CaCO3)	01-E2-SW-003-0	SM 2320B	218			2	RF-SW-RF6-2	310.1			1	0.91%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $\text{pH} = -\log(\text{H}^+)$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detectable.
 mg/Kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem Qual	RL	Sample ID	Method	Result	Lab Rem	RL		
RF-6-2: RF-SW-RF6-2_06072001												
K DISSOLVED (mg/L)	01-E2-SW-003-0	6010B	2	U	2	-	-	-	-	-	-	NC
MG DISSOLVED (mg/L)	01-E2-SW-003-0	6010B	49.9		0.02	-	-	-	-	-	-	-
MN DISSOLVED (mg/L)	01-E2-SW-003-0	6020	0.381		0.00005	RF-SW-RF6-2	6010			.005	4.87%	
MN TOTAL (mg/L)	01-E2-SW-003-0	6020	0.378		0.00005	RF-SW-RF6-2	6010			.005	12.87%	
NA DISSOLVED (mg/L)	01-E2-SW-003-0	6010B	47.9		0.1	-	-	-	-	-	-	-
NITRATE + NITRITE (mg/L as N)	01-E2-SW-003-0	363.2	0.2	U	0.2	-	-	-	-	-	NC	-
P TOTAL (mg/L)	01-E2-SW-003-0	365.3	0.03		0.01	RF-SW-RF6-2	365.1		U	.1	NC	
PB DISSOLVED (mg/L)	01-E2-SW-003-0	6020	0.0005		0.00002	RF-SW-RF6-2	6020			.005	173.33%	
PB TOTAL (mg/L)	01-E2-SW-003-0	6020	0.00068		0.00002	RF-SW-RF6-2	6020		U	.005	NC	
SB DISSOLVED (mg/L)	01-E2-SW-003-0	6020	0.00216		0.00005	RF-SW-RF6-2	6020		U	.005	NC	
SB TOTAL (mg/L)	01-E2-SW-003-0	6020	0.00212		0.00005	RF-SW-RF6-2	6020			.005	130.03%	
SE DISSOLVED (mg/L)	01-E2-SW-003-0	6020	0.003	U, N	0.003	RF-SW-RF6-2	6020		U	.004	NC	
SE TOTAL (mg/L)	01-E2-SW-003-0	6020	0.003	U, N	0.003	RF-SW-RF6-2	6020		U	.004	NC	
SO4 (mg/L)	01-E2-SW-003-0	300.0	539		20	RF-SW-RF6-2	8036			2	10.38%	
TOTAL SOLIDS DISSOLVED (mg/L)	01-E2-SW-003-0	160.1	1150		5	RF-SW-RF6-2	160.1			10	3.59%	
TOTAL SOLIDS SUSPENDED (mg/L)	01-E2-SW-003-0	160.2		U	5	RF-SW-RF6-2	160.2	1	U	1	NC	
ZN DISSOLVED (mg/L)	01-E2-SW-003-0	6010B			0.01	RF-SW-RF6-2	6020	0.11		.01	14.35%	
ZN TOTAL (mg/L)	01-E2-SW-003-0	6010B	0.198		0.01	RF-SW-RF6-2	6020			.01	1.01%	

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RL - Reporting Limit.
Val Qual - Validator qualifier(s).
Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
mg/Kg - Milligrams per Kilogram.
mg/L - Milligrams per liter.
S - Soil.
W - Water.
RPD - Relative Percent Difference.

Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM						UPCM						Usability
	Sample ID	Method	Result	Lab	Val	RL	Sample ID	Method	Result	Lab	RL		
				Rem	Qual					Rem			
RF-7-2: RF-SW-RF7-2_05072001													
AG DISSOLVED (mg/L)	01-E2-SW-002-0	6020	0.00002	U		0.00002	RF-SW-RF7-2	6010			U	.005	NC
AG TOTAL (mg/L)	01-E2-SW-002-0	6020	0.00012			0.00002	RF-SW-RF7-2	6010			U	.005	NC
AL DISSOLVED (mg/L)	01-E2-SW-002-0	6010B	0.05	U		0.05	RF-SW-RF7-2	6020	0.05		U	.05	NC
AL TOTAL (mg/L)	01-E2-SW-002-0	6010B	0.05	U		0.05	RF-SW-RF7-2	6010				.05	NC
ALKALINITY (mg/L as CaCO3)	01-E2-SW-002-0	310.1	130			2	RF-SW-RF7-2	310.1				1	10.91%
AMMONIA (mg/L as N)	01-E2-SW-002-0	350.1	0.05	U		0.05	-	-	-	-	-	-	NC
ANION SUM (meq/L)	01-E2-SW-002-0	SM 1030F1	16.2			-	-	-	-	-	-	-	-
AS DISSOLVED (mg/L)	01-E2-SW-002-0	6020	0.0028			0.0005	RF-SW-RF7-2	6020			U	.005	NC
AS TOTAL (mg/L)	01-E2-SW-002-0	6020	0.0045			0.0005	RF-SW-RF7-2	6020			U	.005	NC
CA DISSOLVED (mg/L)	01-E2-SW-002-0	6010B	145			0.05	-	-	-	-	-	-	-
CATION SUM (meq/L)	01-E2-SW-002-0	SM 1030F1	15.5			-	-	-	-	-	-	-	-
CD DISSOLVED (mg/L)	01-E2-SW-002-0	6020	0.006			0.00005	RF-SW-RF7-2	6020	0.006			.001	0.00%
CD TOTAL (mg/L)	01-E2-SW-002-0	6020	0.00702			0.00005	RF-SW-RF7-2	6020				.001	13.05%
CHLORIDE (mg/L)	01-E2-SW-002-0	300.0				10	RF-SW-RF7-2	325.2	269			1	8.20%
CO3 (mg/L as CaCO3)	01-E2-SW-002-0	SM 2320B		U		2	RF-SW-RF7-2	310.1	1		U	1	NC
CONDUCTIVITY (uMHOS/cm)	01-E2-SW-002-0	120.1				2	RF-SW-RF7-2	120.1	1587			10	4.50%
CR DISSOLVED (mg/L)	01-E2-SW-002-0	6010B	0.005	U		0.005	RF-SW-RF7-2	6010			U	.01	NC
CR TOTAL (mg/L)	01-E2-SW-002-0	6010B	0.005	U		0.005	RF-SW-RF7-2	6010			U	.01	NC
CU DISSOLVED (mg/L)	01-E2-SW-002-0	6020	0.008			0.0001	RF-SW-RF7-2	6020				.005	72.00%
CU TOTAL (mg/L)	01-E2-SW-002-0	6020	0.0048			0.0001	RF-SW-RF7-2	6020				.005	122.58%
FE DISSOLVED (mg/L)	01-E2-SW-002-0	6010B	0.038			0.02	RF-SW-RF7-2	6010			U	.1	NC
FE TOTAL (mg/L)	01-E2-SW-002-0	6010B				0.02	RF-SW-RF7-2	6010	0.21			.1	6.45%
H+ (mol/L)	01-E2-SW-002-0	150.1				1.0E-14	RF-SW-RF7-2	150.1	7.94E-09			1.0E-14	40.86%
HARDNESS (mg/L as CaCO3)	01-E2-SW-002-0	6010B/SM				0.2	RF-SW-RF7-2	2340B	433			0.2	8.62%
HCO3 (mg/L as CaCO3)	01-E2-SW-002-0	SM 2320B	130			2	RF-SW-RF7-2	310.1				1	10.91%

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 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
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 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
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 Val Qual - Validator qualifier(s).
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 RPD - Relative Percent Difference.

Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val	RL	Sample ID	Method	Result	Lab Rem		
RF-7-2: RF-SW-RF7-2_05072001												
K DISSOLVED (mg/L)	01-E2-SW-002-0	60108	2.17			2	-	-	-	-	-	-
Mg DISSOLVED (mg/L)	01-E2-SW-002-0	60108	32.3			0.02	-	-	-	-	-	-
MN DISSOLVED (mg/L)	01-E2-SW-002-0	6020	0.182			0.00005	RF-SW-RF7-2	6010			.005	14.28%
MN TOTAL (mg/L)	01-E2-SW-002-0	6020	0.192			0.00005	RF-SW-RF7-2	6010			.005	8.96%
NA DISSOLVED (mg/L)	01-E2-SW-002-0	60108	1.48			0.1	-	-	-	-	-	-
NITRATE + NITRITE (mg/L as N)	01-E2-SW-002-0	363.2	0.2	U		0.2	-	-	-	-	-	NC
P TOTAL (mg/L)	01-E2-SW-002-0	365.3	0.03			0.01	RF-SW-RF7-2	365.1		U	.1	NC
PB DISSOLVED (mg/L)	01-E2-SW-002-0	6020	0.00348			0.00002	RF-SW-RF7-2	6020			.005	53.16%
PB TOTAL (mg/L)	01-E2-SW-002-0	6020				0.00002	RF-SW-RF7-2	6020	0.026		.005	7.05%
SB DISSOLVED (mg/L)	01-E2-SW-002-0	6020	0.00845			0.00005	RF-SW-RF7-2	6020			.005	26.22%
SB TOTAL (mg/L)	01-E2-SW-002-0	6020	0.00911			0.00005	RF-SW-RF7-2	6020			.005	9.31%
SE DISSOLVED (mg/L)	01-E2-SW-002-0	6020	0.003	U, N		0.003	RF-SW-RF7-2	6020		U	.004	NC
SE TOTAL (mg/L)	01-E2-SW-002-0	6020	0.003	U, N		0.003	RF-SW-RF7-2	6020		U	.004	NC
SO4 (mg/L)	01-E2-SW-002-0	300.0	282			10	RF-SW-RF7-2	9036			2	6.28%
TOTAL SOLIDS DISSOLVED (mg/L)	01-E2-SW-002-0	160.1	836			5	RF-SW-RF7-2	160.1	0.7		10	18.56%
TOTAL SOLIDS SUSPENDED (mg/L)	01-E2-SW-002-0	160.2		U		5	RF-SW-RF7-2	160.2	1.4		1	NC
ZN DISSOLVED (mg/L)	01-E2-SW-002-0	60108	1.72			0.01	RF-SW-RF7-2	6020			.01	15.05%
ZN TOTAL (mg/L)	01-E2-SW-002-0	60108	1.74			0.01	RF-SW-RF7-2	6020			.01	18.75%

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 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
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NC - Not Calculated because one or both concentrations are non detects.
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 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM					UPCM					RPD	Usability
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem		
TP2: RF-TA TP2-4' 65082001												
AG TOTAL (mg/Kg)	01-E2-TA-002-4	6020	17.8			0.02	RF-TA TP2-4'	6010			5	1.12%
AL TOTAL (mg/Kg)	01-E2-TA-002-4	6010B	1220			11.1	RF-TA TP2-4'	6010			5	18.59%
AS TOTAL (mg/Kg)	01-E2-TA-002-4	6020				0.6	RF-TA TP2-4'	6010	188		5	2.11%
CD TOTAL (mg/Kg)	01-E2-TA-002-4	6020				0.06	RF-TA TP2-4'	6010	26		50	20.36%
CR TOTAL (mg/Kg)	01-E2-TA-002-4	6020	9.3			0.2	RF-TA TP2-4'	6010			5	46.91%
CU TOTAL (mg/Kg)	01-E2-TA-002-4	6020	168			0.1	RF-TA TP2-4'	6010			5	12.29%
FE TOTAL (mg/Kg)	01-E2-TA-002-4	6010B	30600			4.4	RF-TA TP2-4'	6010			5	28.33%
H+ (mol/L)	01-E2-TA-002-4	9045C	1.58E-08			1.0E-14	-	-	-	-	-	-
PB TOTAL (mg/Kg)	01-E2-TA-002-4	6010B				22.2	RF-TA TP2-4'	6010	2490		5	17.58%
SB TOTAL (mg/Kg)	01-E2-TA-002-4	6020		N	J	0.06	RF-TA TP2-4'	6010	95		5	21.60%
SE TOTAL (mg/Kg)	01-E2-TA-002-4	6020				1.1	RF-TA TP2-4'	6010	9		5	4.35%
TOTAL SOLIDS (PERCENT)	01-E2-TA-002-4	160.3M	75.2			-	-	-	-	-	-	-
ZN TOTAL (mg/Kg)	01-E2-TA-002-4	6010B	4480			2.2	RF-TA TP2-4'	6010			5	7.52%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B
May 2001 Split Sample Comparison
Richardson Flat, Park City, Utah

Analyte	CDM						UPCM					
	Sample ID	Method	Result	Lab Rem	Val Qual	RL	Sample ID	Method	Result	Lab Rem	RL	RPD
TP1: RF-TA-TP1 3' -0569/2001												
AG TOTAL (mg/Kg)	01-E2-TA-001-3	6020	7.1			0.02	RF-TA-TP1 3'	6010			5	23.60%
AL TOTAL (mg/Kg)	01-E2-TA-001-3	6010B	1540			11.2	RF-TA-TP1 3'	6010			5	0.65%
AS TOTAL (mg/Kg)	01-E2-TA-001-3	6020	249			0.6	RF-TA-TP1 3'	6010			5	18.25%
CD TOTAL (mg/Kg)	01-E2-TA-001-3	6020				0.06	RF-TA-TP1 3'	6010	21		50	31.33%
CR TOTAL (mg/Kg)	01-E2-TA-001-3	6020				0.2	RF-TA-TP1 3'	6010	5	U	5	NC
CU TOTAL (mg/Kg)	01-E2-TA-001-3	6020	349			0.1	RF-TA-TP1 3'	6010			5	40.82%
FE TOTAL (mg/Kg)	01-E2-TA-001-3	6010B	62200			4.5	RF-TA-TP1 3'	6010			5	21.90%
H+ (mol/L)	01-E2-TA-001-3	9045C	3.39E-08			1.0E-14						
PB TOTAL (mg/Kg)	01-E2-TA-001-3	6010B	3650			22.4	RF-TA-TP1 3'	6010			5	7.13%
SB TOTAL (mg/Kg)	01-E2-TA-001-3	6020	9.18	N	J	0.06	RF-TA-TP1 3'	6010			5	64.90%
SE TOTAL (mg/Kg)	01-E2-TA-001-3	6020	1.2			1.1	RF-TA-TP1 3'	6010		U	5	NC
TOTAL SOLIDS (PERCENT)	01-E2-TA-001-3	160.3M	74.3									
ZN TOTAL (mg/Kg)	01-E2-TA-001-3	6010B	4760			2.2	RF-TA-TP1 3'	6010			5	1.04%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs: The calculation used to determine pH is: $\text{pH} = -\log(\text{H}^+)$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detect.
 mg/Kg - Milligrams per kilogram.
 mol/L - Milligrams per liter.
 S - Soil.
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 RPD - Relative Percent Difference.

Appendix B

TP3: RF-TA-TP3 2' 05092001

All samples with Usability column left blank have been determined acceptable.

All samples with Usability column left blank have been determined acceptable. Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule. Shaded results are the higher of the two results. The calculation used to determine pH is: $\text{pH} = -\log([\text{H}^+])$.

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Summary Statistics

Analyte	Media	Total Samples	Non Detects	Acceptable 5x RL	Acceptable RPD	Total Acceptable	Total Acceptable Percent	Unacceptable 5x RL	Unacceptable RPD	Total Unacceptable	Total Unacceptable Percent
AG TOTAL	S	13	9	3	0	12	92.31%	1	0	1	7.69%
AL TOTAL	S	6	0	0	5	5	83.33%	0	1	1	16.67%
AS TOTAL	S	28	1	19	5	25	89.29%	0	3	3	10.71%
CD TOTAL	S	13	4	3	5	12	92.31%	0	1	1	7.69%
CR TOTAL	S	13	1	10	1	12	92.31%	0	1	1	7.69%
CU TOTAL	S	13	0	4	7	11	84.62%	0	2	2	15.38%
FE TOTAL	S	6	0	0	5	5	83.33%	0	1	1	16.67%
PB TOTAL	S	28	0	7	12	19	67.86%	0	9	9	32.14%
SB TOTAL	S	6	2	1	2	5	83.33%	0	1	1	16.67%
SE TOTAL	S	13	10	3	0	13	100.00%	0	0	0	0.00%
ZN TOTAL	S	13	0	0	9	9	69.23%	0	4	4	30.77%
AG DISSOLVED	W	2	2	0	0	2	100.00%	0	0	0	0.00%
AG TOTAL	W	2	2	0	0	2	100.00%	0	0	0	0.00%
AL DISSOLVED	W	2	2	0	0	2	100.00%	0	0	0	0.00%
AL TOTAL	W	2	2	0	0	2	100.00%	0	0	0	0.00%
ALKALINITY	W	2	0	0	2	2	100.00%	0	0	0	0.00%
AS DISSOLVED	W	2	2	0	0	2	100.00%	0	0	0	0.00%
AS TOTAL	W	2	2	1	0	2	100.00%	0	0	0	0.00%
CD DISSOLVED	W	2	1	0	1	2	100.00%	0	0	0	0.00%
CD TOTAL	W	2	1	0	1	2	100.00%	0	0	0	0.00%
CHLORIDE	W	2	0	0	2	2	100.00%	0	0	0	0.00%
CO3	W	2	2	0	0	2	100.00%	0	0	0	0.00%
CONDUCTIVITY	W	2	0	0	2	2	100.00%	0	0	0	0.00%
CR DISSOLVED	W	2	2	0	0	2	100.00%	0	0	0	0.00%
CR TOTAL	W	2	2	0	0	2	100.00%	0	0	0	0.00%
CU DISSOLVED	W	2	0	1	0	1	50.00%	1	0	1	50.00%
CU TOTAL	W	2	0	0	0	0	0.00%	2	0	2	100.00%
FE DISSOLVED	W	2	2	0	0	2	100.00%	0	0	0	0.00%
FE TOTAL	W	2	1	1	0	2	100.00%	0	0	0	0.00%
H+	W	2	0	0	0	0	0.00%	0	2	2	100.00%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
 Lab Rem - Lab qualifier(s).

NC - Not Calculated because one or both concentrations are non detects.
 mg/Kg - Milligrams per kilogram.
 mg/L - Milligrams per liter.
 S - Soil.
 W - Water.
 RPD - Relative Percent Difference.

Appendix B May 2001 Split Sample Comparison Richardson Flat, Park City, Utah

Analyte	Media	Total Samples	Non Detects	Acceptable 5x RL	Acceptable RPD	Total Acceptable	Total Acceptable Percent	Unacceptable 5x RL	Unacceptable RPD	Total Unacceptable	Total Unacceptable Percent
HARDNESS	W	2	0	0	2	2	100.00%	0	0	0	0.00%
HCO3	W	2	0	0	2	2	100.00%	0	0	0	0.00%
AM DISSOLVED	W	2	0	0	2	2	100.00%	0	0	0	0.00%
AM TOTAL	W	2	0	0	2	2	100.00%	0	0	0	0.00%
P TOTAL	W	2	2	0	0	2	100.00%	0	0	0	0.00%
P8 DISSOLVED	W	2	0	2	0	2	100.00%	0	0	0	0.00%
P8 TOTAL	W	2	1	0	1	2	100.00%	0	0	0	0.00%
S8 DISSOLVED	W	2	1	1	0	2	100.00%	0	0	0	0.00%
S8 TOTAL	W	2	0	2	0	2	100.00%	0	0	0	0.00%
SE DISSOLVED	W	2	2	0	0	2	100.00%	0	0	0	0.00%
SE TOTAL	W	2	2	0	0	2	100.00%	0	0	0	0.00%
SO4	W	2	0	0	2	2	100.00%	0	0	0	0.00%
TOTAL SOLIDS DISSOLVED	W	2	0	0	2	2	100.00%	0	0	0	0.00%
TOTAL SOLIDS SUSPENDED	W	2	2	0	0	2	100.00%	0	0	0	0.00%
ZN DISSOLVED	W	2	0	0	2	2	100.00%	0	0	0	0.00%
ZN TOTAL	W	2	0	0	2	2	100.00%	0	0	0	0.00%

Total Samples Compared		222
5x RL	Acceptable	58
RPD	Unacceptable	4
Non Detects		25
Total		NA
Percent		29
		13.06%

All samples with Usability column left blank have been determined acceptable.
 Samples with RPDs above 50% and acceptable were determined acceptable based on the 5x rule.
 Shaded results are the higher of the two results.
 pH has been represented as the hydrogen ion (in mol/L) to compare concentration RPDs. The calculation used to determine pH is: $pH = -\log([H^+])$.
 RL - Reporting Limit.
 Val Qual - Validator qualifier(s).
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 mg/kg - Milligrams per kilogram.
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